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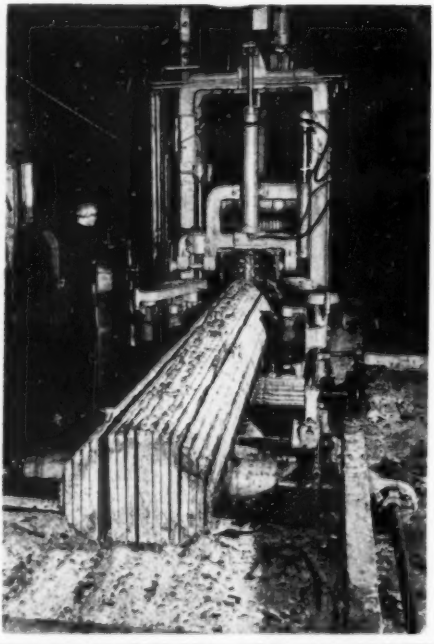

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Editorial

Foresters as Wildlife Managers

Concepts of forest management have changed through the years with increasing knowledge. Multiple-use management as opposed to management for the timber resources alone has made necessary a wider mental horizon and a multiplication of practices and problems for the average forester.

To those interested in wildlife, which is one of the major crops of forest lands, it at times seems that the needed better understanding is progressing altogether too slowly. Yet, looking back over the years, it is obvious that a profound change has come about in the thinking of foresters. This has perhaps come faster in the U. S. Forest Service than elsewhere. Yet, there are a growing number of private holdings on which the multiple-use concept is being applied.

Wildlife is a crop which on some forest lands can conceivably be more valuable than the forests produced under existing conditions. It may be more valuable than the livestock that can be produced by grazing the land. On other units it may take a second or an even lower place. Yet, wildlife management, using present information and knowledge, can be successfully applied to woodlands in connection with silvicultural practices and forest management with little or no added expense.

Any forester, working on public land, who does not recognize the value of wildlife, is overlooking an important land product and also overlooking an important group of citizens when he neglects those interested in wildlife as a source of support for a sane, well-rounded forestry management program.

It is hardly conceivable that the stockmen who graze on forest lands or the lumbermen who look to them as a source of timber supply will ever have the sustained interest in good land management that is inherent in those groups interested in the recreational and wildlife aspects of forest lands. Wildlife enthusiasts and those interested in forest recreation have little expectation of personal gain from these lands. Their interest is, therefore, somewhat more altruistic and less concerned with personal or corporation profits. It is usually easier to sell a sound management program to many people than to sell it to a smaller number who have a personal profit interest in the land.

Many national forests, because of the high altitude or the rough character of the country, are and always will be of greater value for watershed protection by reducing excessive erosion and flash runoff. The maintenance of forest cover is essential and the maintenance of game populations is a natural corollary to sound management of these high and rugged lands.

It has been encouraging to see the interest among foresters in wildlife management. The profession has not, however, progressed as rapidly as many wildlife people would wish. Deer populations have been restored on forest lands, sometimes to excessive numbers. Foresters, remembering that lesson, have sometimes been too persistent in attempting, not only to reduce herds to proper levels, but to keep on with a reduction program when the area had recovered from the overbrowsing and deer populations were well below carrying capacities.

In Utah, within the last year, I have seen national forest areas in which deer populations are still being reduced although the evidence of recovery of the forest vegetation and ground cover is far more complete than it is on the lands on which livestock grazing is permitted. Wildlife technicians generally will agree that it is important to reduce excessive deer populations where they are destroying their own food sources and causing excessive devegetation. They will dis-

agree with foresters who continue to insist on reductions long after any visible evidence of the need for it can be found.

In Utah, this problem became acute some years ago and a Big Game Board was established. It consisted of representatives of livestock interests, U. S. Forest Service, and the Utah Game Department. It has authority to override the Utah Game Department and order a reduction of deer and elk herds in areas in which they become excessively abundant. This program worked well in the beginning but in recent years there has been a growing volume of criticism of the board by sportsmen. There is a growing belief that the forestry representative on this board always votes with the livestock group. Since there are two livestock votes, one from the sportsmen, and one from the Game Department, the forestry man may have the deciding vote.

Foresters have righly voted for reduction in game herds in areas where it was necessary and there has been little criticism for that. However, perusal of the voting records indicates some substantiation of the belief of wildlife enthusiasts that the Forest Service consistently sides with the livestock interests. The volume of this criticism will undoubtedly grow until the foresters demonstrate conclusively that they vote on the basis of the facts presented and that they vote to stop reductions or to actually build up herds when the occasion demands.

Recently, a turkey refuge was established on the Marion National Forest in South Carolina. Other refuge areas and management areas have been established for this bird on other forest lands, usually in cooperation with state game departments. Most of these have been in the southern and eastern states. There is at present a wonderful opportunity to extend this program to the national forest lands in the Southwest where the Merriam turkey is decreasing in numbers. The factors causing this decrease are not known, but it is probable that high among the adverse factors are poaching, overgrazing of turkey ranges by livestock, and, perhaps, predatory animals. There is an excellent chance in the areas where the turkeys need help to establish fenced areas large enough to serve as refuges and seed stock units by removing grazing from them, by fencing if necessary, and giving the birds a chance. Most game departments would be willing to experiment on this kind of program if given an opportunity. A game department that did not would certainly be short-sighted.

These examples are intended to point out some ways in which foresters can increase the contribution they are already making to wildlife welfare. A forester who does not realize that wildlife is a forest crop that can be produced annually is overlooking an asset of the land under his management. He is also overlooking an opportunity to secure strong support from a growing segment of the public solidly behind a management program, once he demonstrates real understanding and appreciation of *all* land resources.

IRA N. GABRIELSON, *President,*
Wildlife Management Institute.

Forest Influences: Growth of a Concept

Future historians of American forestry may devote considerable thought to the growth of the concept of forest influences. In support of this philosophy, the author traces the growth of this concept from its beginning in myth to the present pointing out how beliefs in forest influences affected the course of conservation.

Howard W. Lull

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EARLY settlers in America were convinced that forests exerted some influence over climate, soil, water and man. With this recognition has grown a continuity of thought about the nature and character of such influences. It began with myth and superstition surrounding the climatic and hygienic influences of the forest; graduated to a more factual plane under the stimulus of pioneering research by European foresters; played an important part in the passage of early conservation legislation; grew to a body of knowledge from results of later research; and recently has been translated into action in the present-day shelterbelt and flood control projects.

With this diverse background, it is understandable why misconception and controversies developed as to the effect and extent of the forest influences. Lack of specific knowledge of the subject during early days made any theorizer an expert—advocates of conflicting theories were not reticent.

Of no particular help in specifically defining the subject has been its very title. The name, forest influences, has been generally accepted as representing the physical effects of the forest on soil, climate, and stream flow, and also as denoting that branch of forestry concerned with studying these effects. The title is awkward, lacking in description, and devoid of synonyms. Unfortunately, efforts to devise a more suitable name have been unsuccessful.

First Beliefs—Climatic Influences . . . . . .

The influence of forests on climate was a subject of interest and speculation during the early years of settlement of this country. Antedating Mark Twain, settlers believed they had done something about the weather when they abruptly clear-cut large expanses of timber. Noah Webster, in 1799, wrote that since the cutting of the woods, the weather was more inconstant, "warm weather of autumn extends into the winter months, and winter into summer months" (*21*). An earlier account painted an even more graphic picture:

"The great Moisture in the Air was a mighty inconvenience and annoyance to those who first settled in America; which at that time was much overgrown with Woods and Groves. But as these were burnt and destroyed, to make way for Habitation and Culture of the Earth, the Air Mend'd and Clear'd up space, changing into a Temper more dry and serene than before." (*5*).

Changes in the seasons were portrayed by Michaux, French botanist and explorer, to be as follows:

"Longer summers, later autumns, shorter winters, lighter and less lasting snow and cold less violent were talked of by everybody; and these changes have been described not as gradual and slow, but quick and sudden, in proportion to the extent of cultivation." (*5*).

The belief in the far-reaching effects of these changes may be judged from the fact that at the time of Michaux's description it was generally considered that the deterioration of the climate in the Old World was caused by the cutting of the forests in the New World. These beliefs persisted for many years. As late as the 1860's farm journals had much to say on the subject, the general tenor being that the cutting had caused a decided change for the worse in the climate. One article even advanced the argument that the country's morality was on the wane as the area of cleared land increased.

In addition to the belief that cutting of the forests had modified the seasons, there was also a very definite feeling that precipitation was also affected. Christopher Columbus expressed this thought when he ascribed the daily showers that fell in the West Indies to "the great forest and trees of those countries" and remarked that the same effect was formerly produced in the Canary and Madeira Islands and in the Azores but "now that the many woods and trees that covered them have been felled, there are not produced so many clouds and rains as before" (*16*). This belief continued into the present century. In 1909, one writer rhapsodized, ". . . wooded districts attract every wandering cloud

and make it yield a gentle shower" (*13*), and in 1912, Zon expressed his opinion as follows (*23*):

"Forests in broad continental valleys enrich with moisture the prevailing air currents that pass over them, and thus enable larger quantities of moisture to penetrate into the interior of the continent. The destruction of such forests, especially if followed by weak, herbaceous vegetation or complete baring of the ground, affects the climate, not necessarily of the locality where the forests are destroyed, but of the drier regions into which the air currents flow."

These beliefs about the supposed effects of the cutting of the forests on the climate of extensive and remote areas are generally discounted by present-day students of the subject. Holzman (*11*) believes the major source of moisture for precipitation in the United States to be air masses of distant origin—a belief shared by many meteorologists. There is evidence, however, that forests exert a significant influence on the local and microclimate of an area (*12*). Wilm recently summarized the modern concept of the influence of the forest on climate as follows (*22*):

". . . no conclusive evidence has been found to demonstrate that climate, and especially precipitation, has been appreciably modified by the progress of settlement and the removal of forests. About all that can be said is that the forest does influence the microclimate within and adjacent to its own body; and this is true of any variation in the earth's aspect, such as a city or a field of corn."

Hygienic Influences

At the time when it was held that forest cutting had produced climatic changes, there was also current a conviction that the forests had an influence on the health of the populace. An observer in 1785 stated that forests and swamps produce "a gross putrescent fluid that caused irregular, nervous, intermitting and remitting fevers." This rather clinical statement was discounted by another observer who believed that the marshes served the purpose of correcting forest air which was deemed too pure because of its high oxygen content (*5*).

In his *History of New Hampshire*, Belknap censured such opposing views (*2*):

"It is . . . amusing to observe these theorizing philosophers; for whilst one condemns the air of woodlands as destructive to life and health, another celebrates it as contributing nutritive particles, and asserts that men who live in woods consume less food than those who dwell in open countries."

He then went on to describe his own beliefs as to the healthful effects of the forest:

"It has been a general observation that the first planters in new townships live to a great age. It is also true that the air of our forest is remarkably pure; the tall and luxurious growth not only indicates strength and fertility of soil; but conduces to absorb noxious vapors. . . . A profusion of effluvia from the resinous trees imparts to the air a balsamic quality which is extremely favorable to health, and the numerous streams of limpid water . . . cause currents of fresh air which is in the highest degree salubrious, to those who reside in their banks."

Settlers were particularly concerned with the influence of the forests on malaria. And with good reason, for according to Lillard (*15*):

"A specially serious hazard to backwoods pioneering was the intermittent fever called malaria or ague. It was directly associated with half-cleared forests and newly cleared land, and in rainy America every colony or territory at one time or another suffered from the disease. Mother of inertia and poverty, more demonstrable than original sin, malaria seemed in many places to be almost a fixed condition of humanity."

To reduce the incidence of malaria, one scientist proposed to increase the evaporation from woods and marshes by clearing through the forest a lane 200 miles long in the direction of the prevailing wind. This, he believed, would provide ventilation and furnish healthful areas on which to settle (*5*). In contrast to this novel plan was an observation (*1*) that, "In all malarial regions a belt of trees interspersed between a swampy place and a dwelling is known to be a defense against malaria." A similar Italian proposal (*16*) suggested the use of aspen plantations "to obstruct air from malarious localities and thus intercept a great proportion of the pernicious exhalations."

Due to lack of knowledge concerning disease carriers, the beliefs in the sanitary influence of the forests continued for many years—as witness a Department of Agriculture statement of 1902 (*9*):

"The soil conditions of the forest are unfavorable to the production and existence of pathogenic microbes, especially those of cholera and yellow fever, and the comparative absence

of wind and dust, in which microbes are carried into the air may be considered as the principal claim for the hygienic significance of the forest."

Early Research Efforts

Factual information from investigations conducted by European foresters during the period 1868-1884 began to replace the fanciful, particularly as to the climatic influences of the forest. It is difficult to say how much of this information found its way to this country. However, it may be supposed that the first American foresters, European trained, returned with much of the new knowledge.

Almost a century before this initial period of research, a Dr. Williams of Vermont made comparative temperature readings of soil in the open and wooded ground (*16*)—perhaps the first study of a forest influence in this country. At the time the inquiring practitioner was so engaged, the French Revolution had succeeded in removing the cutting restrictions in that country, resulting in wholesale cutting of the timber. According to Pinchot, consequences of this action were observed by 1792 and questions were raised as to the forest and climate relationship (*19*). However, slightly over a half of a century elapsed before observers actually began to measure influences, and it was not until 1867 that measurements were made on a comparative basis (forested and adjacent non-forested areas) when Dr. Ebermayer, in Germany, utilized the double station method. Perhaps one of his more diverting discoveries: a family of four persons requires for respiration the oxygen exhaled by 2½ acres of forest (*9*).

In 1868 a Congress of a German Foresters and Farmers, meeting in Vienna, appointed a committee to study the subject of forest influences. The committee proposed a series of problems which included determinations of temperature, evaporation, precipitation, and ground water in the forest as compared with open areas. Interest in the subject can be gauged by the fact that 4 years later the first bibliography on forest influences was published with larger references numbering 190[1] and many more brief references (*9*).

German foresters took the lead in the influence studies and in a series of experiments determined the climatic effects. Their paired climatic stations were equipped with psychrometers, maximum and minimum thermometers, six soil thermometers for various depths, an evaporimeter, and a rain gauge—a collection of instruments comparable to those used in present day stations. In addition to collecting weather data, observers also recorded the time of leafing and flowering of plants, the arrival and disappearance of certain designated birds and insects, and the mating season of the deer and rabbit (*9*).

By 1880 studies in influences had determined that temperatures within the forest are slightly lower than in the open, that relative humidity in the forest is raised and evaporation diminished. While these results were expressed at an international conference on meteorology held in Rome, doubts were raised as to the influence of the forest on absolute humidity or frequency or quantity of precipitation; at the same time the importance of measuring stream flow was stressed. Discussions of instrumentation pointed out that while observation of evaporation was important there was no measuring instrument that could be recommended; neither could the so-called lysimeters be recommended for the measurement of ground water seepage. Four years after the Rome conference, the former president of this gathering, a prominent Austrian scientist, declared that the general character of the influence of the forest on climate was already determined and now only the elaboration of details was required (*9*).

Influences and Conservation Legislation

A few years prior to the time of this confident statement the conservation movement was born in the United States. At its birth and throughout the early years of rapid growth the belief in influences was one of the motivating forces of this movement, particularly the belief that forests have a salutary effect on stream flow and water supply.

Pioneer conservationists had a dual purpose: to conserve timber and to protect water supplies. The latter purpose often received the major emphasis as exemplified in Pinchot's statement (*19*), "the forest reserves in the West are useful first of all to protect the drainage basins of streams used for irrigation.'

This protective action was worded into a bill introduced to Congress in 1876 that proposed setting aside and preservation of all public timber lands "adjacent to sources and effluents of

[1] In the 1940 bibliography of North American Forestry containing "titles of only the more important literature in forestry," forest influences is represented with 700 references (*17*).

all rivers in order to prevent these rivers from becoming scant of water." Failure of this bill was somewhat compensated for by passage of a measure in the same year which ordered an investigation into the supply, consumption, and preservation of timber, and as to "the influence of forests on climate" (*20*). Passage of this legislation was due to the efforts of the American Association for the Advancement of Science which had prepared a memorial, sent to Congress with a special message from President Grant, advocating appointment of a commission to study the forest situation. In this memorial, the influences of the forests were described as follows:

"Besides the economical value of the forests . . . there are questions of climate that appear to have a close relation to the presence or absence of woodland shade. The drying up of rivulets, which feed our mill streams and navigable rivers and supply our canals, the failure of the sources which supply our cities with pure water, and the growing tendency to floods and drought resulting from the unequal distribution of the rainfalls since the cutting of the forests are subjects of common observation." (*6*).

With the establishment of the Division of Forestry in 1881, forest conservation acquired the authority of a federal bureau. Again forest influences was involved: this time as one of the three reasons, according to Fernow, for the establishment of the division:

". . . the widespread influence which forest areas, their presence or absence, and their condition have upon water flow, upon soil and climate, hence influencing navigation, damage by floods and changes in agricultural conditions thereby imparting to forest cover a particular communal interest . . ." (*6*).

Fernow elaborated on this reason with the following somewhat vehement and lengthy sentence:

"In spite of the facts, which have become clear to most other civilized nations, namely, that a forest cover on the slopes of mountains prevents erosion and equalizes water flow, reduces danger from floods, and decreases extremes in high and low water stages, in spite of these well known observations, the Government of the United States has persisted in allowing its vast public timber domain on the western mountain ranges to be destroyed by fire and otherwise, and spends millions of dollars annually in river and harbor bills to dig out the eroded farms, which have been swept into the river for lack of the protection of the soil at the headwaters and along shores." (*6*).

In 1891 legislation was enacted which authorized the President to set aside forest reserves from the public domain. Six years later, by the Act of 1897, Congress provided for administration of these reserves and reaffirmed the presidential power to create reserves "for the purpose of securing favorable conditions of water flows and to furnish a continuous supply of timber"—notice the priority in this wording.

Finally, passage of the Weeks Law in 1911, authorizing purchase of private lands for naional forests, utilized to an extreme the belief that forests regulate stream flow. Constitutional limitations disallowed passage of this measure for its major purpose, conservation of timber. However, the law could be enacted if its avowed purpose was to aid navigation by protecting forested watersheds, a stratagem in accordance with the right of Congress to regulate commerce among the states.

Opponents of this bill were not as unfriendly to the creation of forest reserves as they were critical of the extravagant arguments with which backers of the bill extolled the effectiveness of forests in regulating stream flow. Represented in the main by members of the engineering profession, the opponents questioned the effectiveness of the forests as stream flow regulators. To the conservationists, such questioning bordered on the heretical; arguments that developed did not settle the point—neither side had sufficient evidence to support its argument. Fernow, as editor of the *Forestry Quarterly* during that period, summed up the debate as follows:

"The heated discussion on forest influences on stream flow continues with considerable acrimony but with little real addition to fact to substantiate or controvert the claims that have been made. There is a great need for thorough investigation extending over a period of years." (*7*). A year later he expressed the forester's viewpoint when he concluded that there was still no definite proof as to the effect of forest cover on floods, "but nevertheless our natural philosophy cannot escape the conviction that such influence exists and what it must be." (*8*).

That the Weeks bill became a law was not so much Congressional approbation of this philosophy as it was an affirmation of the public support of a measure which authorized "ex-

amination, survey, and acquirement of lands located on the headwaters of navigable streams." In such a manner did a belief in a forest influence offer a legal loophole which allowed the Government to create national forests through purchase of private land. As Cameron, primed with metaphor, wrote:

"In this case the forest could not be carried by direct assault but could be taken by creating a diversion at the river." (*3*).

Present-day Concepts

The controversy over the Weeks bill did not produce an answer to the question of the influence of forests on stream flow. It did, however, reveal the scarcity of experimental evidence and the need for more research. This need was met by passage of the McSweeney-McNary Forest Research Act of 1928 which provided for intensive forest influences studies in various parts of the country.

Research since 1928 has supplanted much of the speculation about forest influences with a growing body of facts. Numerous workers have reported results of detailed studies and several, including Zon (*24*), Wilm (*22*), and Kittredge (*14*) have developed summaries of the facts about forest influences. These may be partly summarized as follows:

1. Removal of forest cover, by reducing interception and transpiration losses, generally results in increased runoff.

2. Removal of forest cover when accompanied by baring of the soil, generally decreases infiltration and increases overland flow, soil erosion, and sediment loads.

3. A forest cover will not present all flows or keep all sediment out of streams, for every watershed has inherent runoff and sediment producing characteristics.

4. Maintenance of the natural forest cover will keep runoff and sediment loads within normal limits, and restoration of a depleted forest cover may in time restore runoff and sedimentation rates to normal.

Knowledge of the possibilities and limitations of forest influences has been put into practical use within the past few years through the initiation of two major conservation programs. Following the dust storms of the early 30's came the Shelterbelt Project—and with it, an immediate controversy, within the profession, as to its likelihood of success (*4*). This dispute was later settled in favor of the Project (*18*).

No such controversy marred the second of the programs, flood control. Following the disastrous floods in 1936 it was recognized that the success of a flood control program depended on upstream as well as downstream remedial measures. Resultant legislation, the Omnibus Flood Control Act, gave legal recognition to "runoff and water flow retardation and soil erosion prevention on the watersheds of the waterways" (*10*). Numerous watershed surveys have been completed since the passage of this act and action programs are now under way.

Though the forest influences concept has grown from Colonial-day myth to present-day action programs, there is as yet no evidence that the concept has been fully accepted. Continued shortages of water supplies, particularly in the West, have focused attention on methods of watershed management to increase water yield, yet few if any specific management practices for increasing useful runoff have been put into effect. In spite of demonstrated flood control benefits, watershed improvement action programs are lagging. Too, the Shelterbelt Project lacks completion; meanwhile, recent cultivation of potential dust bowl land has extended the need for shelterbelts.

In keeping pace with the demands for water, flood control, and dust bowl protection, the forest influences concept will undoubtedly keep growing in stature. Continued research and more demonstration should speed the process. It may well be that, in the near future, forest influences will be considered a product of the standing forest—comparable in importance to those products derived from felling the forest.

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Abstract of Master's Thesis

The Application of General Staff Principles to the Fire Control Problem. By Edward S. Kotok, University of Michigan. 1947.

The four-section general staff is equally valuable to armies in the field and fire organizations engaged in their "battle role." General staffs, regardless of echelon, operate under a stringent doctrine.

A suggested doctrine for fire control organizations is based on the following six concepts:

1. The responsibilities and powers of the commander are without challenge. The staff will be coordinated by a chief of staff.

2. The staff shall be organized along functional divisions and duties will be equitably distributed among the various staff sections so as to maintain nearly balanced work loads. Four staff sections—personnel, intelligence, operations, and supply—would meet the necessary requirements for balanced distribution of tasks.

3. Duties which fall within a certain staff section at one level must fall within that same staff section at all levels. Only by such delineation can personnel be shifted and replaced freely without impeding organizational efficiency.

4. Complete standardization of organization must exist throughout the entire fire organization, from the Washington office to ranger districts and suppression crews. Only the complexity of duties will vary.

5. The organization will be designed so that it expands in a pyramidal fashion. There will be at all times but a single commander.

6. A reserve force will be maintained and used continuously if need be, but only where final and decisive results can be achieved.

Importance of Stock Quality in Survival and Growth of Planted Trees[1]

Field-run seedlings, sorted into four grades and planted in Wisconsin 13 years ago, show differences according to grade. High mortality of the poorer stock in an early drought year proves the benefits of better stock. The relatively few culls that did survive are now almost equaling the growth rate of the better-stock trees.

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WITH ONLY one-sixteenth of an 80-million-acre reforestation job completed,[2] American foresters are on the alert for ways in which to speed up the program. Faster progress can be made by using only thrifty, well-developed seedlings, for then the probability of a failure under critical conditions is minimized. Without the need for replanting failures, all facilities can be concentrated on initial work.

Great differences in mortality between good and poor grades of planting stock have been observed in Wisconsin in a 13-year-old study of the effect of quality on survival and growth. In this study the best grade of 1-0 jack pine now has more than four times as many survivors as the poorest grade. Even the second best grade is nearly 300 percent better than the fourth or poorest grade. The critical period in the lives of these seedlings occurred during the first growing season, which happened to include one of the most severe droughts of record in the Lake States.

Although severe losses occurred in the inferior grades, the subsequent growth of the survivors was contrary to our expectations. At the time of planting it was thought that runts would continue to be runts and that thrifty, well-balanced seedlings would attain merchantable size much sooner than poorly developing seedlings. Now we find that current variations in height are small, even though early observations indicated great differences in the rate of growth.

In 1935 when these seedlings were set out, planting commanded a work priority second only to fire on the Nicolet National Forest in northeastern Wisconsin. In those days the need for using only the best grade of stock was not so well known by field men. With ample manpower, thousands of acres in need of reforestation, and a limited supply of stock, foremen were loathe to throw away any seedlings that appeared to have even a remote chance for survival. So it was decided to provide the personnel of the Lakewood Ranger District with firsthand, visual proof of the desirability of maintaining high standards for planting stock.

Field-run seedlings as received from the Hugo Sauer Nursery were sorted into four grades with the following specifications:

Good.—Excellent thrift; top 3 or more inches high; root over 4 inches long with many laterals.

Fair.—Good thrifty top 2½ to 3 inches tall; root over 4 inches long with normal lateral development.

Poor.—Poor thrift; top 2 to 2½ inches tall; root 4 inches or over but poorly developed; few laterals.

Cull.—Substandard; top under 2 inches tall; root under 4 inches long; very few laterals.

The planting site was part of a large tract that had been burned repeatedly since the occurrence of the Peshtigo holocaust in 1871. The soil, a Vilas fine sand, supported a sparse stand of aspen, pin cherry, shadbush, sweet fern, and sedge grasses. The depth of the ground-water table on the 2½-acre study area was about 8 feet and probably had no direct influence on survival or growth during the first two years after planting.

The seedlings were hand-planted on a 4 by 6-foot spacing in furrows prepared during the preceding summer. Each grade of stock was planted in two replications of two rows each with a check plot of field-run seedlings placed in two contiguous rows along one side of the study. Two CCC enrollees, selected for proficiency, set out a total of 4,500 trees. Each man planted two rows of each grade and one

[1]Acknowledgment is made to Austin C. Zapp, general manager, Algoma Plywood and Veneer Company, Woodstock, Ontario, for assistance during the first two years of the study, and to Joseph H. Stoeckler, silviculturist, Lake States Forest Experiment Station, St. Paul, Minn., for advice in the preparation of this article.

[2]Gaging the timber resource of the United States, Report 1, U. S. Dept. Agric., Forest Service, 1946.

row of the check, thus eliminating possible differences in results due to quality of planting.

All living seedlings were examined several times during the first year and at the end of the second and thirteenth growing seasons. Survival was progressively better with each improvement in the quality of planting stock. As shown in Figure 1, this factor is very significant, ranging from only 12 percent for cull stock to 53 percent for good stock after two growing seasons; and, of course, this difference is permanent. Survival in the check plot and in the surrounding plantation was better than the second class but not quite so good as the first class of graded stock, indicating that a high percentage of the nursery output was of good quality.

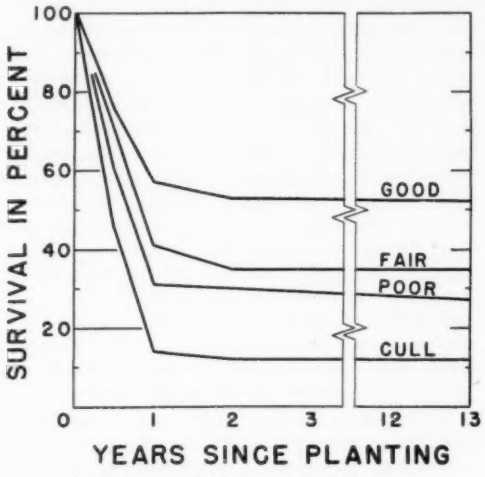

FIG. 1.—Survival of graded 1-0 jack pine.

The height-growth trend so pronounced in favor of the good stock after the second growing season appears to lose importance as time permits the poorer trees to overcome early handicaps. This change is shown in Table 1. There appears to be very little difference today in the thriftiness of trees from the various grades of stock. All appear fairly thrifty except for about 5 percent of the trees which have been damaged by the Saratoga spittle bug. This damage appears to be equally distributed among the various replications.

The summer of 1936 was extremely dry and hot. Air temperatures in the shade exceeded 100° F. on five consecutive days between July 3 and 10. Mortality from heat during that period alone was 24 percent for good stock, 31 percent for fair stock, 40 percent for poor stock, and 54 percent for cull stock. Of the trees that died in the first two years after planting, over 98 percent were victims of drought and heat.

Present standards in the North Central Region of the U. S. Forest Service call for planting 1½-0 or 2-0 jack pine with a stem caliper of 5/64-inch, a minimum top of 3½-inch, and an 8-inch root. The justification for this high standard is clearly borne out by the results of this study.

TABLE 1.—AVERAGE HEIGHT ATTAINED BY VARIOUS GRADES OF 1-0 JACK PINE PLANTING STOCK

Grade of stock	Number of growing seasons		
	1	2	13
	Inches	*Inches*	*Inches*
Good	7	15	180
Fair	5	10	178
Poor	4	11	167
Cull	3	8	165

Time Study Technique

Forestry literature contains many reports of logging and milling analyses involving time studies, but seldom does there appear a discussion of the procedures and techniques upon which the conclusions are founded. This paper is an attempt to correct partially some of the lack of basic discussion.

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THIS DISCUSSION of time study technique is an outgrowth of a logging and milling study conducted at the Bent Creek Experimental Forest near Asheville, N. C.[1] The analysis makes no pretension to solving all the problems of foresters' time studies, but it may clarify some of the required procedures and stimulate further thinking on the subject.

Purpose of Time Study

Time study has a special function for the forester in helping to establish economic controls for the harvesting and utilization of timber products. Specifically, the forester is interested in determining the tree and log sizes at which costs and returns are balanced, the unprofitability associated with some sizes, and the margins available for stumpage and profit at other sizes. This information can be obtained, once the study is completed, by relating hourly costs to logging and milling time for different tree and log sizes, converting to unit volume costs, and comparing costs with probable yields. As a special problem, the forester may be interested in timing logging and milling operations with the purpose of determining the most economic combination of labor and equipment.[2]

Recording Elapsed Time

For the usual purposes of a logging and milling time study, the elapsed time of an operation is recorded as observed. No adjustment is made if the performance of a work crew is judged to to be above average or below average. If several crews are employed in a particular operation such as felling and bucking, the sample observations should be made on all crews in proportion to their production. The fact that one crew may be 50 percent less efficient than another may be unfortunate, but observations of its time performance are as valid to the determination of marginal logs and trees as are time observations of the more efficient crew.

A whole operation such as felling, bucking (or felling and bucking), and skidding is usually the unit of observation. Each of these operations has a number of component elements. In skidding, e.g., hooking, out-trip, unhooking, and return trip are separate elements susceptible to separate timing. But unless it is assumed that time for particular elements of the operation may be used again in other time studies, or unless the forester is attempting a minute analysis in the search for weak elements in the production process, particularization is not necessary. Usually the forester is interested only in the overall time of each of the operations, at least for the classification "work" time. In timing delays there is more interest in setting up several classifications such as "rest," "tools or equipment," and "miscellaneous," because of the great variability in these elements.

Timing does not need to be very precise. Observations which cover less than 5 minutes can be read to the nearest quarter-minute. Above 5 minutes the nearest half-minute will suffice, and above 20 minutes any reading closer than the nearest whole minute is deceptive.

A choice between a stop watch or an ordinary watch is not usually very significant. With the stop watch each observation is read directly and no further calculation is necessary. Moreover, it enables the observer to detect at once if a particular observation is out of line with the others, and he can look for the cause. In continuous reading, watch time rather than the elapsed interval is recorded. Elapsed time is calculated later; hence, one may not note in the field if a particular observation is out of line. This system may suffer from the defect of becoming more mechanical, since attention is focused on recording, not on observing. Nevertheless, in

[1] The results of the Bent Creek study, including profit and loss calculations by log and tree sizes, were released in Technical Notes 62, 63, 64, and 65 in July 1946 by the Southeastern Forest Experiment Station, Asheville, N. C.

[2] The purpose of time studies in most industries is more ambitious. Industrial engineers frequently make time studies to set up standards of work performance and to serve as a basis for incentive wage plans.

actual practice the suposed defects of the continuous reading system are not readily apparent, and there is a great compensation in that all time must be accounted for. Especially when field assistants are not well trained, the latter feature alone justifies the continuous reading system.

Work Time and Delay

Timing must distinguish between what is considered work time and what may be differentiated as delay time. For this purpose, observations must cover whole days. Furthermore, it is necessary to spread observations over a period of more than a few days' duration. In loading, e.g., a few days' sample will suffice for a record of work time, but if one serious machine breakdown should occur in this brief period, it would distort the relation of delay to work time.

No defect in the operation is necessarily implied by delay. Some delays are inherent in the working process, such as rest after heavy exertion. But it is necessary to separate delays on the records: first, to explain much of the variation in output between crews and operations, and second, to facilitate the calculation of time variations by log and tree sizes.

In the first use, we must recognize that one crew may have delays amounting to half of the total time, and another crew may have delays that amount to 20 percent of the total. Obviously, the output of these crews will be widely different even though working efficiency may be similar. In the second use, it is supposed that work time varies by log and tree sizes. Delay is separated because it is considered to be independent of tree or log size. Perhaps the supposition is not strictly true, but it would require a large sample to show the actual relation between delays and size classes, and little can be gained from such an attempt at refinement. After work time has been calculated by diameter classes, delay can be added as a fixed percentage of work time.

In timing any operation, the key crew member is observed and his time assigned to the whole crew. In the Bent Creek study, one man in each felling crew did all the undercutting. The idleness of the partner was not considered a delay so long as it did not hold up the activity of the key man. In skidding, time was recorded for the teamster and team. Similarly, in loading, the time of the 3-man crew was recorded as a unit and depended on the activity of the loading machine operator. In sawmilling, all the time observations were related to headsaw output. Mill workers had to keep up with the sawyer's production, and if they failed to do so, the sawyer had to slow down. But if the sawyer relaxed, lumber output slumped correspondingly, no matter how busy the other crew members appeared.

Where time variation by log and tree sizes is sought, time is recorded as work time only when it is apparently associated with size. Thus, in the felling operation at Bent Creek, essential swamping around the base of a tree was recorded as a delay since it was assignable to the felling operation, not to a particular tree size. Similarly, breaking a log loose from a tangled deck of logs was recorded as a loading delay. In sawmilling, rolling a log down to the carriage was part of the work time for the particular log, but if the sawyer halted to roll several logs on the deck and bring them closer to the carriage, the interruption was recognized as a delay and was not assignable to a particular log.

The considerable time which cannot be assigned to the individual tree, log, or log load, is illustrated in Table 1.

Work Time by Log and Tree Size

Time records gathered in the field can be analyzed through arithmetic and free-hand curving or through the more complex, but more accurate and sometimes more informing, method of regression equations.

Regression equations were adopted for the Bent Creek study for two reasons: (1) a regression curve showing variation in time with log or tree size is more accurate than a free-hand curve; (2) derivation of regression coefficients permitted calculation of work time for various specified conditions such as bucking a fixed number of logs per tree, or skidding for various degrees of slope, distances, load volumes, and numbers of logs per load.

For those who know how to use regression equations, the method is usually recommended. However, it needs to be emphasized that the forester does not always need the greater accuracy of regression equations or the ability to calculate time for a great variety of assumed conditions. Free-hand curves are adequate if the forester's purpose is to determine bucking time for average-height trees and skidding time for average distances, average slopes, and average loads, or even if the data are to be worked

TABLE 1.—DIVISION OF TOTAL ELAPSED TIME INTO WORK AND DELAY TIME; BENT CREEK STUDY

	Felling and bucking	Skidding	Loading	Hauling	Unloading	Sawmilling
			Percent			
Delays:						
Rest	5	11	2	1	20	2
Tools or equipment	7	1	12	5	—	9
Miscellaneous	8	30	23	10	27	12
Work	80	58	63	84	53	77
Total	100	100	100	100	100	100

TABLE 2.—TIME REQUIRED FOR LOGGING AND MILLING OPERATIONS PER M BOARD FEET OF LOGS, GROSS VOLUME, BY LOG DIAMETER; BENT CREEK STUDY

Log diameter	Bucking[1]	Skidding[2]	Loading[3]	Sawmilling[4]	
				Hard hardwoods[5]	Soft hardwoods[6]
Inches	*Man-minutes*	*Man-minutes*	*Crew-minutes*	*Crew-minutes*	*Crew-minutes*
10	169	373	131	134	134
12	159	285	78	88	81
14	151	221	53	70	64
16	144	185	40	59	54
18	138	163	30	54	46
20	134	148	24	50	43
22	131	136	19	46	39
24	129	127	16	45	36
26	128	120	14	44	35
28	128	115	13	45	36
30	129	110	13	46	37
32	130	105	13	48	40
34	132	101	13	52	41
36	134	97	14	58	44
38	136	94	16	63	48
40	138	91	18	70	53

[1]Felling and bucking was done by two-man crews using axe and cross-cut saw.

[2]Skiddding slopes ranged up to 100 percent but averaged 30 percent. Skidding distance averaged 167 feet. Log loads varied from one to eight logs. Skidding crews included a team of horses, a teamster, and occasionally a grabjack. Swamper's time was not included since he worked independently of skidding crews.

[3]Loading equipment included tongs, attached to a 150-foot cable, and suspended from an A-pole frame, plus an automobile engine for power. Crew consisted of a loader operator and two men (truck drivers) to hook, guide, and unhook logs.

[4]Sawmill was stationary, circular mill sawing about 10 M board feet of lumber per day. Seven men operated the mill and two men worked in the yard piling lumber.

[5]White ash, beech, black birch, hickory, sugar maple, and all oaks.

[6]Basswood, buckeye, black cherry, chestnut, black gum, magnolia, red maple, and yellow poplar.

up separately for several classes of tree heights or skidding conditions.

In using free-hand curves, one requires a simple average of the field time-observations for each operation. Average time for each tree, log, or log load is plotted over diameter class and a smooth, balanced curve is drawn. Time is converted to a unit volume basis to permit comparisons between operations and the application of hourly costs.

The purpose of totaling the time required to produce logs of different sizes is usually to determine the marginal-size log; i.e., the size at which the anticipated costs and returns of producing an additional log are equal. For this purpose, the summation of time by log sizes begins with the bucking operation. The usual assumption that felling time for each tree needs to be apportioned to its component logs is not correct.

The biggest problem in calculating work time by log sizes is in operations where the load rather than the log is the unit of handling. This problem of joint costs is posed in skidding, hauling, and sometimes in unloading. Theoretically, the problem may appear to be insoluble, but practicable solutions can be suggested. In the Bent Creek study, the problem was met through the use of regression equations. A simpler method is to apportion the time for each load to the component logs on the basis of the ratio of log volume to load volume.

After work time in each operation is calculated per unit of volume by log size, total elapsed time is computed by adding average delays as a fixed percentage of work time.

Results of the time analysis in the production of logs under average conditions at Bent Creek are shown in Table 2. Truck hauling and unloading time are not shown in the table because these operations did not indicate that time varied significantly with log size. The size of the load made little difference in hauling time per trip. The 37.3-mile round trip required an average of 110 truck-minutes per M board feet. In unloading, which was done by two truck drivers who traveled and worked together, no correlation was observed between log size and time of operation. Some of the biggest logs and loads of logs required the least time for unloading because of the more significant effects of position of logs on load, taper, sweep, and roughness. The elapsed time of 10 crew-minutes per M board feet could be assigned to all log sizes.

Time calculations by tree-size classes are far more difficult to make, since felling is the only operation where time is recorded directly in terms of tree size. At Bent Creek felling and bucking were observed together, but even where bucking is calculated separately, bucking time can be added up for each tree directly, converted to a unit volume basis, and curved over tree-

TABLE 3.—TIME REQUIRED FOR LOGGING AND MILLING OPERATIONS PER M BOARD FEET OF LOGS, GROSS VOLUME, BY TREE DIAMETER; BENT CREEK STUDY

Tree diameter	Felling and Bucking[1]	Skidding[2]	Loading[3]	Sawmilling[4]	
				Hard hardwoods[5]	Soft hardwoods[6]
Inches	*Man-minutes*	*Man-minutes*	*Crew-minutes*	*Crew-minutes*	*Crew-minutes*
14	475	321	97	107	98
16	431	268	75	88	80
18	390	234	61	75	67
20	351	206	48	64	58
22	316	184	40	58	52
24	285	167	34	54	48
26	256	155	27	50	44
28	234	146	22	48	41
30	218	139	19	46	40
32	213	132	18	45	40
34	214	127	16	44	39
36	219	124	16	44	39
38	225	122	14	44	39
40	236	120	16	45	40
42	251	119	18	46	41
44	278	118	21	49	44

[1], [2], [3], [4], [5], [6] See footnotes in Table 2.

diameter class. The real difficulties occurred in skidding, loading, and sawmilling, where a rather laborious system of tree reconstruction was used. Essentially, this method was to review the tree-log relationships obtained from the felling and bucking observations, weight the time per unit volume for each log size in a tree by the ratio of log volume to tree volume, sum up each tree's time per unit of volume, and curve over tree-diameter class. The results of these procedures are summarized in Table 3.

Identification of logs as to tree origin could make reconstruction into time by tree-size classes much simpler and much more accurate. Time required for any tree would be obtained by adding up the time required to log and mill the component logs. The advantage in accuracy of keeping track of the tree origins of logs more than compensates for the extra pains of record keeping in the field.

Conclusion

The forester's interest in time study is primarily to discover the time required to log and mill trees and logs of different sizes.

Field technique for this purpose is not complicated. Only a few principles governing the measurement of time need to be clarified, and these relate chiefly to the broad division of elapsed time into work and delay elasifications, the precision of timing necessary, and the selection of key crew members to be timed.

The most difficult problems arise in the office analysis of the field data. Should free-hand curves or regression equations be the basic analytic tool? How can time for a load of mixed logs be converted into time for the individual logs in the load? How can time by log-size classes be conveniently and correctly converted into time by tree-size classes?

For these problems of time study technique, this paper offers some guides and solutions.

Forest Succession in the Southern Piedmont Region

The disrepute in which casual surveys—like opinion polls—are held may be deserved because of their frequent bias. Particularly is this true of car-window observations, such as the automobile survey described here. Precautions taken to obtain a sound sample, however, included the use of Tippett's "Random Sampling Numbers" to avoid possible personal bias in sample county selection, plus extensive observation from secondary county roads beyond the main highways to avoid over-sampling forest conditions associated with the principal routes of travel. Moreover, the primary contribution from this reconnaissance is the Figure 1 chart, which attempts to do no more than portray the status and direction of forest succession in the Piedmont today.

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THE ORIGINAL cover of the Piedmont uplands is conceded to have been predominantly hardwood with a scattering of pine seed trees. The hardwoods were destroyed thoroughly—roots as well as tops—in the clearing and cultivation of millions of farm acres. Land abandoned for agriculture reverted to forests, mostly of pine. Although much fertility in surface soils was lost in the process, and second-growth frequently understocked, the land is not idle. The extensive, often fully stocked young pine stands are a storehouse of potential wealth. Their industrial use is assured.

With soil that is perishable under tillage, extensive forest regeneration is essential to our economy. Shall we again have pine or reversion to the less valuable upland hardwoods?

The pines appear as a temporary cover type, scarcely able to maintain themselves under present conditions. The factors favoring pine are (1) its frequent crops of wind-blown seed, (2) exposed mineral-soil seedbeds, and (3) superior growth rates. Factors favoring hardwood are (1) its persistence as a tolerant understory, (2) vigorous sprouting capacity, and (3) inferior markets. The combined effect of these factors favors hardwood. But what is the present score or regional status?

Sampling Procedure

Data were taken in 21 sample counties in South Carolina, Georgia, and Alabama in 1946. These samples comprised about one-quarter of the area in 81 southern Piedmont counties. Some 692 miles of forest were systematically observed in the three states. The terrain bordering each traversed road was classified as upland forest or other miscellaneous land use. Upland forests were subdivided into eight broad condition classes with gross differences in age and species composition as follows: (1) young pine, (2) old pine, (3) young hardwood, (4) old hardwood, (5) mixed pine-hardwood, (6) pine reproduction, (7) hardwood reproduction, and (8) reproduction of mixed pine-hardwood.[1]

No clearly significant differences in the distribution of conditions between states were found. The results here apply to the 13 million upland forest acres in the southern Piedmont region of the three states.

Reconnaissance Findings

Distribution in 1946 of the 8 condition classes of upland forest was as follows:

	Percent	
Pine		
Young	60	
Old	5	
Both		65
Hardwood		
Young	8	
Old	6	
Both		14
Mixed pine and hardwood		16
Reproduction on recent cuttings		
Pine	2	
Hardwood	2	
Mixed	1	
All		5
Total		100

There is nearly four times as much Piedmont forest in pure stands of young pine as in any other one condition. Many of these stands are nearly all pine. While it is not difficult to find spots where hardwood has started to encroach as

[1]Mixed stands were 25 to 75 percent pine in the dominant canopy. The pure type had 75 percent or more trees in the species group named. Ten or more trees 10 inches in d.b.h. or larger were needed per acre in the old-timber classes. Young timber was largely sapling and pole-sized trees. Tally by speedometer reading was kept to the nearest 0.1 mile. Hence, in general the system did not recognize separate condition classes of less than 6.4 acres. Frequent stops to examine the woods on foot reduced classification errors to 5 percent or less.

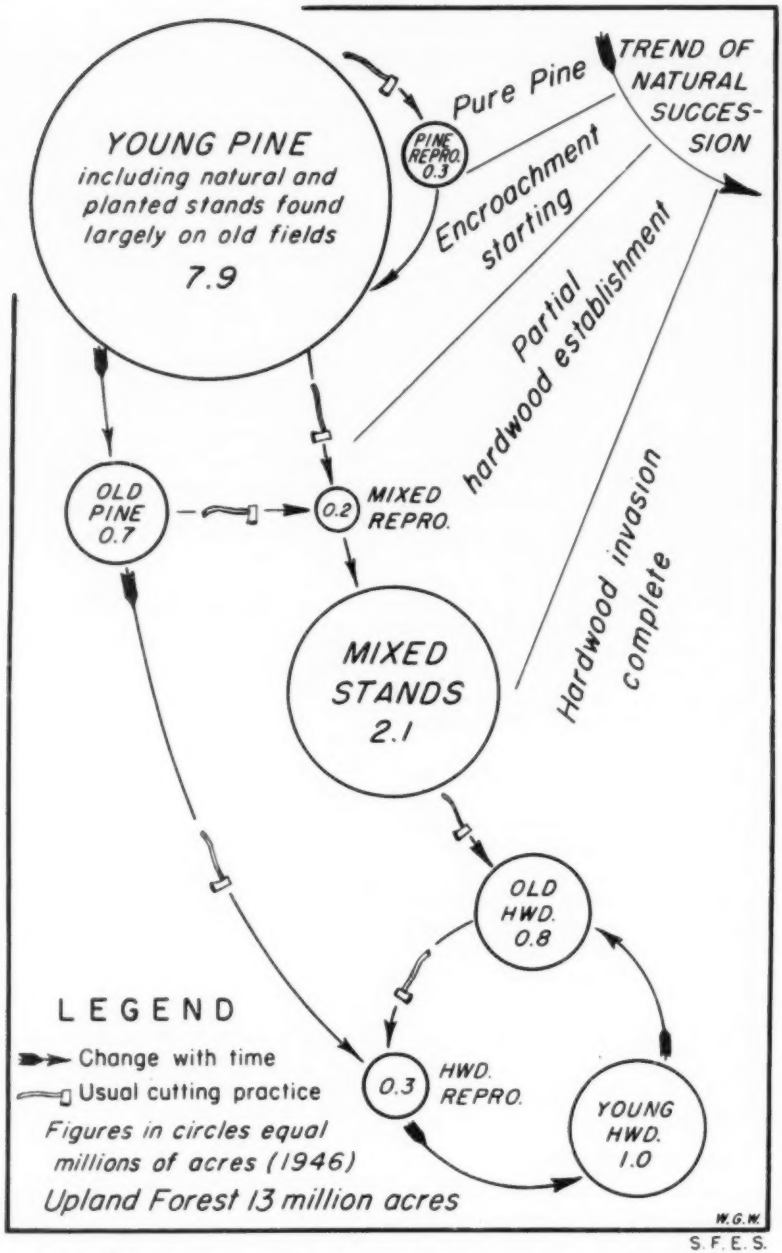

Fig. 1.—Conditions in 1946 resulting from man's and nature's combined influences upon upland Piedmont forests. Nature slowly tends toward climax hardwoods. The large circle, representing 7.9 million acres of young pine, reflects an era of farm land abandonment now past; for a time it reversed the hardwood trend. Man prefers to cut out the pine, and so hastens the swing toward hardwoods.

an understory, a majority of these pure young stands are so well stocked that (in the absence of cutting) understory hardwoods have not developed. Where these young pine stands are undisturbed, they remain nearly 100 percent pure over many thousands of acres.

Figure 1 portrays the more prevalent transformation from one forest condition to another. The relative size of the circles reflects the status of major conditions. The lines between them show changes through growth alone (plain arrows) or development after the usual cutting practice (arrows with axes).

The diagram suggests that the reproduction following the current cutting practices immediately returns as much hardwood as pine to the land. It indicates, for example, that reproduction on recent cutting (1 to 5 years old) covers 300,000 acres in each of the pure types and 200,000 acres in the mixed type. After young or old stands have been cut, pine does not reproduce with equal facility at all points. One reason is the beginning of hardwood encroachment in certain places, notably the thinner stands incidental in young timber and characteristic of old growth. The presence or absence of a hardwood understory largely accounts for the different reaction to cutting indicated at the top of the diagram. Mixed regeneration may replace any pine stand to some extent. Pure pine reproduction is definitely assured only where there has been a negligible undergrowth of hardwood.

Where a suppressed hardwood understory exists, pure hardwood regeneration readily follows the cutting of pine. Advance reproduction of hardwoods often is a prior claim on the site. This is especially noticeable when the older pine stands are cut. There the result may be due to a scarcity of pine seeds at time of cutting, but most often it is due to the abundance of well-established hardwood roots.

Many operable mixed forests have been transformed to pure hardwood simply by the removal of the more readily salable pines.

Many recent clearings have been small enough to reseed readily to pine from the side. Others have a wholly or partly adequate seed supply from unmerchantable pines or seed bearers that have developed from trees left because they were just under-size at the time of cutting. The less favorable results were found where the distribution of these trees happened to be poor. At the time of cutting, a preponderance of pine over hardwoods in both overstory and understory is most likely to lead to favorable composition in new growth. The forest floor remains relatively bare under continuous, fully stocked stands. Elsewhere, a minimum of underbrush—both young hardwoods and woody shrubs—gives pine a better chance where there is no pine regeneration in advance of cutting.

Natural succession, aided by man's reduction in the frequency of fire and his increasing uses for softwood, favors hardwood. Most harvest cuttings of timber benefit the forest seedbeds by stirring up the soil cover, but are not otherwise so planned as to foster desirable new growth. Yet pines need some cultural assistance to assure positive results in natural reproduction. Without it the pines probably cannot reclaim more than half the area being released by present cuttings.

Barring accelerated progress of the littleleaf malady of shortleaf pine, complete conversion to hardwood will be slow because so much of the young pine is still below merchantable size. For this reason there was little commercial cutting in spite of heavy demands for forest products during the war years.

The unusually large area of young pine in the southern Piedmont presents an outstanding opportunity for pine forest management that will economically arrest or delay natural succession, and produce satisfactory yields of third-growth pine timber.

Douglas-Fir Site Quality and Soil Fertility

Evaluating site quality of large areas of cut-over lands and overmature stands in the Douglas-fir region requires a system of classification based on properties of the soil and associated features of climate and topography. This study of available nutrient levels of some Douglas-fir forest soils is the first phase of an investigation into the possibility of developing such a classification method. The results indicate that on undisturbed soils fertility is not a limiting factor in Douglas-fir growth in the Pacific Northwest.

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RAPID development of the Pacific Northwest and consequent heavy drain on the timber supply have brought about a clear recognition of the need for taking stock of the entire forest situation. Today there is deep interest in growth rate of trees. The supply of mature and overmature timber has dwindled and loggers are forced to rely more and more upon second-growth stands of Douglas-fir. As a result of this situation an improved method of site classification is required because the present system (*9*), employing height and age of dominant and codominant trees, has limitations which prevent accurate classification of the productive capacity of large areas of cut-over and burned forest lands.

The complexity of factors involved in predicting tree growth necessitates a thorough study of the forest environment. Such a study is under way to develop a system of site classification that will relate tree growth to the physical site. This paper reports results of the first phase of that study—an investigation of the Douglas-fir environment with respect to soil fertility.

Literature

The topic of soil fertility arises often in discussions of forest growth, and much has been written for and against the value of chemical soil analyses in solving problems of tree growth; yet not much is known about nutrient levels of specific sites. This perplexing situation is well summed up by Lutz and Chandler (*8*) who say: "The fact that the surface 6 in. of a given forest soil contains 50 lb. of available P_2O_5 per acre means little until it is correlated with growth or yield of specific species. Very little is at present known about the relationship between definite soil fertility levels and site quality of forest soils."

As quoted by Toumey (*15*), Schutze concluded from studies in Scotch pine that there is no direct relation between site-class and amounts of chemical nutrients in the soil, although in general the poorer sites are slightly lower in nutrients than better sites. He found a progressive increase in the amount of fine particles from the poorest to the best sites, and concluded that the physical character of the soil, especially the water-retaining capacity, is of particular importance in determining site-quality.

Hilgard (*5*) states: "In practice it will be found in most cases that a stunted native growth is due not so much to lack of plant food in the soil as to unfavorable conditions. Among these, shallowness and extreme heaviness of the soil are the most common causes."

Lutz and Chandler (*8*) quote Valmari as having found that site quality in Finland improves with increases of nitrogen and calcium in the upper soil horizons. These same authors also cite Lang's conclusions that chemical properties of the soil are most important to tree growth near the northern limits of the thermal range of a species and least near southern limits.

In the Pacific Northwest, the work of Powers (*10*) and Powers and Bollen (*11*) has shown that the maximum numbers of microorganisms and the highest colloid content occur in the F layer of the forest floor. The maximum base exchange capacity is generally found in nearly neutral F or largely humified H layers. Taylor (*14*) found that nitrate nitrogen is an important factor in the establishment of Sitka spruce and Western hemlock seedlings. Holtby (*7*) found that in a localized area of south central Washington State the soil texture 6 inches beneath the surface is a fairly reliable indicator of site quality for ponderosa pine. He also states that soil texture does not afford a reliable basis for site determination in the Douglas-fir region of western Washington where the topography is extremely rough. Hill et al. (*6*) point out a correlation between Douglas-fir site index and soil profile characteristics used as criteria in the utilitarian soil survey method employed by the Soil Conservation Service.

Soils of the Region

The soils of the Douglas-fir region are derived from such a diverse range of materials as marine sediments, basic igneous rock, granitic and other acidic rocks, volcanic ash, unstratified glacial drift, and in localized areas, alluvial deposits. Most of the upland soils display some signs of podsolization due to high rainfall and a prevailing cool climate. Humus layer types vary from twin mulls on the less strongly podsolized soils to matted mors on soils having a definitely leached A_2 horizon.

Field Methods

Five localities in Oregon and Washington were selected for sampling. In each of these areas soil samples were collected under Douglas-fir stands ranging from site I to site IV, as determined by the height-age method described by McArdle and Meyer (*9*). To minimize local climatic effects as much as possible the soil sampling positions were located so that the range from site I to site IV occurred over a relatively short distance. Site V was not included in the study because it is not well distributed, being rather clearly limited to areas of high altitude, droughty soils, or low rainfall.

All soils sampled had been undisturbed during the life of the stand. In order to sample all four site classes within each selected area it was necessary to include stands ranging in age from 40 years to more than 300 years. However, most of the observations were made in stands 80 to 100 years old.

At each sample point a pit about 3 feet in diameter was opened to the depth at which parent material was encountered. Soil samples were taken from the A_1, A_2, and B horizons, although half of the soils sampled were found to have such slight A_1 horizon development that no pure sample of that horizon could be taken. For these soils data for only A_2 and B horizons are available, and only these horizons are considered in the statistical analysis.

Soil from each desired horizon was collected around the exposed face of the pit, mixed on a clean canvas, and about 1,500 grams of the mixture taken as the laboratory sample. This procedure was repeated at another situation of similar soil and topography on the same site within a radius of 30 to 50 feet. All samples were air dried and passed through a 2 mm. sieve.

Laboratory Methods

Determinations of silt-plus-clay content and pH were made by the author. Chemical analyses were made by the National Bureau of Standards Laboratory at the University of Washington, Seattle. The following analyses were made of all samples: total nitrogen (*2*); available phosphorus (employing the Fisher electrophotometer) (*16*); available potash (*17*); base exchange capacity, replaceable calcium, and replaceable magnesium (*4*); organic matter (*18*); silt-plus-clay content (*3*); and pH, determined by the La Motte-Morgan colorimetric method.

Discussion

Using site-locality interaction as an estimate of sampling error (Table 1), none of the values resulting from the nine analyses made of all A_2 and B horizon samples indicate any statistically significant relation to site class. This lack of relation is shown further by generally wide variations between maximum and minimum values of each determination found within a single site class. Average values are given in table 2.

Soil reaction values ranged between pH 4.9 and 6.4 for the A_2 horizon and 4.7 and 6.4 for the B horizon. In general, the residual soils range between pH 5 and 6 and show only small variations between horizons. Lowest pH values were found in the highly leached, siliceous A_2 horizons of coarse textured glacial drift soils, while the highest pH values were found in the B horizons of these same soils.

Content of soil material less than 0.05 mm. in diameter, or silt-plus-clay content, showed wide variations among similar site classes over the region. Although the areas sampled showed no significant relation between site class and soil texture, informal observation suggests that such a relation may exist in areas of level topography and low precipitation. A decrease in site quality was observed in several areas in Oregon and Washington where the soil texture changed from fine to coarse under like rainfall and temperature conditions.

The apparent lack of relation between soil fertility and site class may be associated in part with the methods presently used to measure soil nutrients. It is now known that there is a direct exchange of cations between roots and the soil, so that nutrient elements need not necessarily go into the soil solution to be made available to the plant. Mycorrhizal activity also provides a

means of nutrient intake for the plant, thus adding to total nutrient availability.

Nitrogen is possibly the most important of the elements considered in this study but it does not appear to constitute a limiting factor in tree growth in the areas sampled. The amount of nitrogen in soils has been found to be closely associated with climate and soil moisture levels (*13*). In the Douglas-fir region the amount of soil nitrogen is seen also to be closely correlated with the amount of organic matter as has been observed in many other cases.

In a discussion of phosphorus, Wilde (*19*) gives an available P_2O_5 content of 100 ppm. as being sufficient for most forest trees, those such as light-demanding pines being said to require only 10 to 15 ppm. Lutz and Chandler (*8*) emphasize that phosphorus in highly acid soils may pass into relatively unavailable iron or aluminum combinations, this fixation being greatest in soils containing large amounts of active iron and aluminum. As the residual soils of the Douglas-fir region contain much iron and aluminum and are slightly to strongly acid, this condition explains the generally low level of available phosphorus in these soils (*12*). However, if Wilde's 10 to 15 ppm. phosphorus requirement for light-demanding pine can be used as an approximate measure, then most of the soils studied offer an adequate supply of the element even in the lower horizons, since they contained an average of 12 ppm. in the B horizon with much higher quantities in the A_1 and A_2 horizons (table 2).

Available potash content of Douglas-fir soils was found to be from 10 to 20 times greater than that of phosphorus, a few soils showing even higher differences. Forest trees are known to require several times more potassium than phosphorus. The sandy soils studied contained considerably less available potash than the residual soils; although almost all showed at least 100 ppm. average or more (table 2), an ample supply if 25 ppm., given by Wilde (*19*) as the requirement of light-demanding pine, is used as a guide.

Further study of base exchange in soils of the Douglas-fir region might be of value in working toward a method of site classification because the base exchange capacity of a soil is a resultant of mineral colloid and organic matter content. Wilde (*19*) says: "The high capacity of exchange material for holding water, and the marked influence of absorbed bases on the coagu-

TABLE 1.—VARIANCE RATIOS[1]

Source of variation	D/F	Horizon	pH	Silt-plus-clay	Total N	Available P	Available K_2O	Base exch. capacity	Replaceable Ca.	Replaceable Mg.	Organic matter
Site (S)	3	A_2	0.67	0.94	0.52	1.77	1.11	0.60	2.86	0.74	0.46
		B	0.13	0.55	0.78	1.01	1.64	0.78	1.10	0.93	1.11
Locality (L)	4	A_2	7.01[2]	1.58	2.63	2.24	2.72	2.40	3.66[3]	1.85	4.94[3]
		B	1.04	3.23	4.16[3]	5.62[2]	3.02	1.63	4.63[3]	3.20	4.67[3]
Error (Interaction SL) ...	12										
Total	19										

Mean square of group means
Mean square of individuals

[1]Known also as F or x; the ratio,

[2]Significant at 1 percent level.
[3]Significant at 5 percent level.
Climatic and basic pedological differences not studied in this experiment are considered responsible for the high degree of significance of several of the determinations when locality is tested.

lation of colloids and the development of soil structure enable the exchange material to exert a profound influence upon the physical properties of soils." In this connection, the relation between base exchange capacity and content of mineral and organic colloidal material appears worthy of further consideration in the study of site classification.

Soils of the Douglas-fir region are generally low in calcium because of pronounced leaching by rainfall and also because of low original calcium content in soils derived from marine sedimentary materials. Wilde (*19*) gives 5 milliequivalents per 100 grams as a satisfactory calcium supply for non-calciphilous trees, conifers not requiring as large amounts of calcium as do broadleaved species. As with the other nutrients studied, calcium showed wide variations among similar site classes over the Douglas-fir region.

Magnesium content of forest soils is usually 1/5 to 1/3 that of calcium (*19*). This ratio was found generally applicable to the areas sampled. The maximum value found was 4.2 m.e. per 100 grams and the minimum value 0.3 m.e. per 100 grams, both figures being obtained from site I samples.

Organic matter content varied over the region, being consistently higher in fine-textured soils than in coarse, sandy soils, an observation also made in Minnesota forests by Alway and McMiller (*1*).

Summary and Conclusions

A study of available nutrient levels or soil fertility of various forest soils of the Douglas-fir region of the Pacific Northwest has been made and the relation of nutrient availability to site class studied.

No statistically significant relation was found between site class and values obtained from laboratory determinations of soil reaction, silt-plus-clay content, total nitrogen, available phosphorus and potash, base exchange capacity, replaceable calcium and magnesium, and organic matter. In general, the nutrient content of forest soils of the Douglas-fir region appears to be too high to constitute a limiting factor in tree growth.

TABLE 2.—AVERAGE VALUES FOUND FOR SOME SOIL CHARACTERISTICS, DOUGLAS-FIR REGION

Determination	Horizon[1]	Site I	Site II	Site III	Site IV
Soil reaction (ph)	A_1	5.2	5.7	5.6	4.8
	A_2	5.6	5.4	5.4	5.6
	B	5.7	5.6	5.6	5.6
Silt-plus-clay content (percent)	A_2	45	46	50	36
	B	50	47	53	42
Total nitrogen (percent)	A_1	0.55	0.24	0.33	0.49
	A_2	0.21	0.22	0.16	0.15
	B	0.11	0.13	0.09	0.09
Available phosphorus (ppm.)	A_1	39	31	11	26
	A_2	16	45	13	22
	B	14	16	10	10
Available potash (ppm.)	A_1	316	572	365	305
	A_2	200	230	140	140
	B	120	150	105	165
Base exchange capacity (m.e./100 gm.)	A_1	36	22	21	32
	A_2	16	15	14	11
	B	12	11	10	7
Replaceable calcium (m.e./100 gm.)	A_1	12.0	8.0	6.8	4.5
	A_2	3.2	6.6	2.7	1.7
	B	1.6	2.8	2.5	1.0
Replaceable magnesium (m.e./100 gm.)	A_1	2.1	1.9	1.9	1.8
	A_2	0.9	1.1	1.4	0.7
	B	0.8	1.0	1.5	0.6
Organic matter (percent)	A_1	20.0	9.4	10.6	18.3
	A_2	6.8	7.6	5.5	7.5
	B	3.0	4.1	2.5	3.5

[1]Since half of the soils studied had little or no A_1 horizon development, figures given for the A_1 horizon do not have equal weight with those for A_2 and B horizons.

An investigation into the relation of physical characteristics of soil and site is considered the next step to be taken in the study of Douglas-fir site classification.

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Composition of Gum Turpentine of Knobcone Pine

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KNOBCONE pine (*Pinus attenuata* Lem.) is a Pacific Coast species, growing in widely scattered places on the barren or rocky slopes at medium altitudes both of the coastal ranges and of the Sierra Nevada from southwestern Oregon to southern California. Botanically, this pine belongs to the group Insignis, or closed-cone pines, and is closely related to Monterey pine (*P. radiata*) and Bishop pine (*P. muricata*). The chemistry of turpentine of Monterey pine and Bishop pine is known: Monterey pine turpentine consists of alpha and beta pinenes[1] and Bishop pine turpentine consists chiefly of alpha-pinene[2] with a very small admixture of camphene.

Oleoresin of knobcone pine was collected in the summer of 1945 by members of the Institute of Forest Genetics near Kelsey, El Dorado County, California, at an elevation of 1,500-1,800 feet. The trees were over-mature, of poor growth, and of rather grotesque appearance. The site is extremely dry and poor, and the ground is covered with shrubs, chiefly manzanita (Arctostaphylos). The summers in this locality are very hot and dry. Twenty trees were tapped, using conventional turpentining methods. Tapping started at the beginning of June, continued at weekly intervals for 12 weeks, and was discontinued at the end of August. Altogether about 3,000 grams of oleoresin were obtained. The average yield of oleoresin per tree per week was 13.6 grams. The oleoresin crystallized in the receptacles into a hard mass. The collected oleoresin was kept in air-tight jars in cold storage until it was analyzed in September 1946.

The oleoresin was heated in a 2-liter Claisen flask in an oil bath under reduced pressure; the temperature of the bath towards the end of distillation reached 200° C. and the pressure was reduced to 0.05 millimeters by a Nelson-Cummings high vacuum pump. The yield of volatile oil (turpentine) was as follows:

Date of oleoresin collecting	Turpentine
	Percent
June 9	24.2
June 27	23.4
July 24	23.8
August 25	24.0

The yield of turpentine is very high considering the hot and dry environment of the place where the oleoresin was collected. Apparently evaporation of the volatile oil was prevented by a film

[1] McComb, T. H. Turpentine from pines. New Zeal. Jour. Sci. and Technol. 12, pp. 333-337. 1931.

[2] Mirov, N. T. Composition of gum turpentine of Bishop pine. Jour. Forestry 45:659-660. 1947.

TABLE 1.—FRACTIONAL DISTILLATION AT 20 MM PRESSURE OF 475 GRAMS OF *Pinus attenuata* TURPENTINE

Fraction	Temp.	Distillate	Index of refraction n_D^{23}	Density d_4^{23}	Specific rotation $[\alpha]_D^{23}$
	°C.	*Grams*			
1	45-46	3.6	1.4644	.8528	+17.8
2	46	85.4	1.4648	.8522	+17.6
3	46	317.0	1.4650	.8519	+17.4
4	46	47.0	1.4656	.8509	+17.2
5	46	6.5	1.4665	.8522	+14.8
6	46-48	5.0	1.4677	.8512	+12.2
Residue left in the distilling flask		10.5	1.4810	.8768	+12.8

of rosin formed on the surface of the gum in the receptacle. The turpentine obtained from the oleoresin of *Pinus attenuata* had the following characteristics:

Density d_4^{20}	=	0.8520
Index of refraction n_D^{20}	=	1.4652
Specific rotation $[\alpha]_D^{20}$	=	+17.1°

A total of 475 grams of the volatile oil was subjected to fractional distillation at 20 mm pressure, using a vacuum-jacketed, 12-inch distilling column filled with glass helices and equipped with a constant reflux 1:4 ratio stillhead. The results of the fractional distillation are presented in Table 1.

Ninety-seven percent of the oil distilled at a constant temperature of 46° C. Judging from the densities and the indices of refraction, the bulk of the oil, if not all of it, consisted of dextro-alpha-pinene. Alpha-pinene was identified by preparing pinene nitrosochloride from fraction 3. After several precipitations from chloroform with methanol, the nitrosochloride melted at 103° C. The melting point of the nitrosochloride mixed with a known nitrosochloride showed no depression.

It is seen from the foregoing that knobcone pine turpentine is a product of unusual purity, and of a very simple composition. It differs from Bishop pine by the total absence of camphene; it differs from Monterey pine by the absence of β-pinene. This information may be of value in studies of turpentine of the Monterey x knobcone hybrid (planned for the near future) and also in establishing the relationship of the closed-cone group of pines to which knobcone pine belongs.

Observations on Japanese Red and Japanese Black Pines in Central Oklahoma

Japanese red and Japanese black pines, growing in forest plantations near Stillwater, Oklahoma, have been under observation during the past 8 and 6 years respectively. Both species have been found hardy and adapted to local growing conditions, comparing favorably with other, more common pines in survival and growth. Behavior of Japanese black pine has been particularly impressive. Of six species of pine tested, it has been first in survival and second in rate of growth. It has also been among the species least susceptible to injury by the pine tip moth.

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During the past 8 years' observations on the adaptability, behavior, and growth characteristics of several species of pine have been carried on near Stillwater, Oklahoma. Among these were two species of Japanese pines, which have not been tried in this region for afforestation purposes. It should be pointed out that afforestation in central and western Oklahoma has as its objective, not timber production, but principally for sheltering crops and farm property from wind, for soil erosion control, and fence-post production. The value of a forest tree besides its adaptability therefore should be judged by its ability to serve one or more of these objectives.

The two exotic species are *Pinus densiflora*, Sieb. & Jucc., Japanese red pine and *P. thunbergi*, Parl., Japanese black pine. Two native species of pine, *P. echinata* L. and *P. ponderosa*. Lawson are also brought into discussion to serve as standards with which the Japanese pines can be compared.

Japanese black pine has been a subject of intensive study by Littlefield and others, mainly along the Atlantic seaboard. In the East, *P. thunbergi* proved to be "The most satisfactory species for coastal forestation and landscape planting."[1]

Japanese red pine has also been used as a forest tree in this country to a limited extent. The author has failed to locate any published work on this species, though some references to *P. densiflora* can be found occasionally in forestry and botanical literature.[2]

Both the Japanese black pine and the Japanese red pine were introduced into this country in the second half of the last century.

The first planting of *P. densiflora* at this station was made March 15, 1940. The site is located on an east slope with thin sandy soil underlaid by hardpan at a depth of 8 to 15 inches. The presence of hardpan created considerable difficulty during planting, at which time not much promise was held for the survival, and still less for reasonably good growth of the pine. To make the situation more critical, no adequate care could be provided for the plantation due to shortage of labor and equipment during the war. Despite these handicaps, Japanese red pine has survived and grown remarkably well. After 8 years in the field, the survival of *P. densiflora* in this particular plantation was 74.4 percent. No other species of pine was planted on the same site to permit comparison, yet the survival figure, on the basis of the author's observations on pines in central Oklahoma, can justifiably be termed good. The growth of *P. densiflora* has been equally impressive. Eight years after planting, the pine has formed a dense mass of foliage to an approximate height of 12 feet (Fig. 1).

In the second plantation, started in December 1942, six species of pine have been distributed fairly evenly throughout the site, permitting reliable comparison of the behavior of various species. The original planting of 1942 has been supplemented annually by replacement of dead and missing trees by new 1-1 stock. This plantation occupies a site with western exposure on fairly deep sandy soil, changing to somewhat heavier texture toward its lower end.

Figures on the survival of pines in plantation number 2 during the first few years are presented in Table 1.

Generally low survival figures can be attributed to several causes ranging from the unfavorable weather and soil conditions on the

[1] Littlefield, E. W. Pinus thunbergi: A successful exotic on the North Atlantic Coast. Jour. Forestry, 40:566-573. 1942.

[2] Editor's Note: See Hicock, Henry. The Rainbow Forest Plantations, 1942, Bul. 464. Conn. Agric. Expt. Sta., New Haven, Conn.

days of planting to the presence of rabbits which cut off a few trees every winter. The latter cause might have been selective, the loss from rabbits being higher among some species than among others. However, as long as rabbit menace to young plantations exists throughout the state, this source of injury to trees should be considered in the selection and use of various species of trees in Oklahoma. Young plants of western yellow pine appeared to be somewhat more susceptible to rabbit injury than other species. Table 1 shows that as far as survival is concerned, Japanese red pine compares favorably with the native pines, while Japanese black pine is far above all pines tested.

FIG. 1.—Japanese red pine after 8 years in the field formed an efficient barrier against the wind. The tendency to spread sidewise resulted in early crown closure and rapid accumulation of litter on the ground.

From the standpoint of height growth, the two Japanese pines occupy an intermediate position among the pines under observation, growing slower than the shortleaf but faster than the western yellow pine.[3] Figure 2 represents average heights of four species of pine for 5 and 6 consecutive years in the field. Figure 3 shows relative heights and forms of four pines after 3½ years in the field. In comparing the average heights of shortleaf and Japanese red pines with the height of Japanese black pine, some loss in growth of the two former (estimated to be between 6 and 12 inches), should be taken into consideration. This was caused through injury by the pine tip moth (*Rhyacionia frustrana*, comst.) which in the last few years has been very destructive in and around Stillwater.[4] On the basis of the number of trees and tips affected, shortleaf pine was particularly susceptible to the insect, Japanese red pine was less so, while Japanese black and western yellow pines were only slightly susceptible. In view of the widespread occurrence of the pine tip moth in Oklahoma, the relative freedom of the Japanese black pine from injury by this insect enhances the potential value of this species in forest plantations of Oklahoma.

Both Japanese pines are hardy in Oklahoma. In January 1947 they withstood temperature as low as —15° F without any sign of injury. Some yellowing of needles occurred on the shortleaf and on both Japanese pines as a result of subfreezing temperatures in March 1947.

[3] In height growth both Japanese pines exceeded also the Austrian and the Scotch pines planted during the same years.

[4] Afanasiev, M. and F. A. Fenton. Pine tip moth and its control in Oklahoma. Jour. Forestry 45:127. 1947.

TABLE 1.—SURVIVAL OF FOUR SPECIES OF PINE IN A PLANTATION 3 MILES NORTH OF STILLWATER, OKLAHOMA

Species	Planting season	Number of trees planted	Percent survival at the end of the summer of:			
			1943	1945	1946	1948
Shortleaf	1942-43	180	27.8	27.2	27.2	27.2
Western yellow	1942-43	360	46.9	41.3	37.2[1]	37.2
Japanese red	1942-43	258	36.8	32.9	32.9	25.2
Shortleaf	1943-44	130	60.8[2]	60.0	59.2	59.2
Western yellow	1943-44	191	30.9[2]	22.0		18.3
Japanese black	1943-44	134	94.0[2]	91.2	82.1[1]	82.1

[1] At the end of summer 1947.
[2] At the end of summer 1944.

However, the damage appeared to be rather superficial and the trees have fully recovered from the injury.

In the early stage Japanese red pine under Oklahoma conditions has a poor form, forks freely, and often acquires a bushy appearance. Persistent insect injury to the tip of the leading stem has probably contributed markedly to the development of several new leaders and the shrub-like form of the Japanese red pine. In plantation number 1, which which so far has been free of moth injury, the tendency of the pine to maintain a single leader has not been hampered. Consequently, the pine has a definite tree-like appearance. As a producer of usable wood, Japanese red pine is inefficient. However, from the standpoint of its protective value in windbreaks, it should prove to be equal or superior to pines used for that purpose at present (Fig. 1).

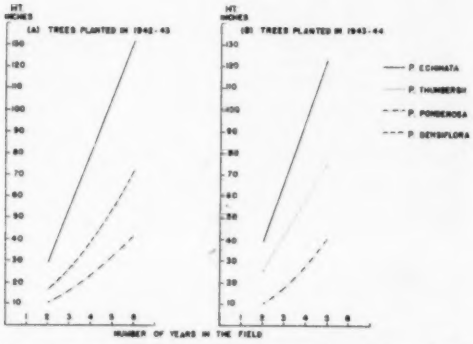

FIG. 2.—Average heights of four species of pine: (A) five years and (B) six years after planting.

Japanese black pine has a better form than Japanese red pine, although it too has occasionally a tendency to fork. Because of the very rapid growth of the main stem, Japanese black pine has an "open" appearance and would undoubtedly be less effective in a windbreak than most pines now used in Oklahoma. For the same reason of fast growth of the stem and its comparatively good form, it should be capable of producing rapidly large quantity of usable wood.

On the basis of observations during the short periods of 6 and 8 years, it is impossible to predict either further behavior of the Japanese pines or their value in forestry work in this region. Yet their behavior to date and certain desirable features described above should justify further and more extensive trials of both pines in this and other parts of the country.

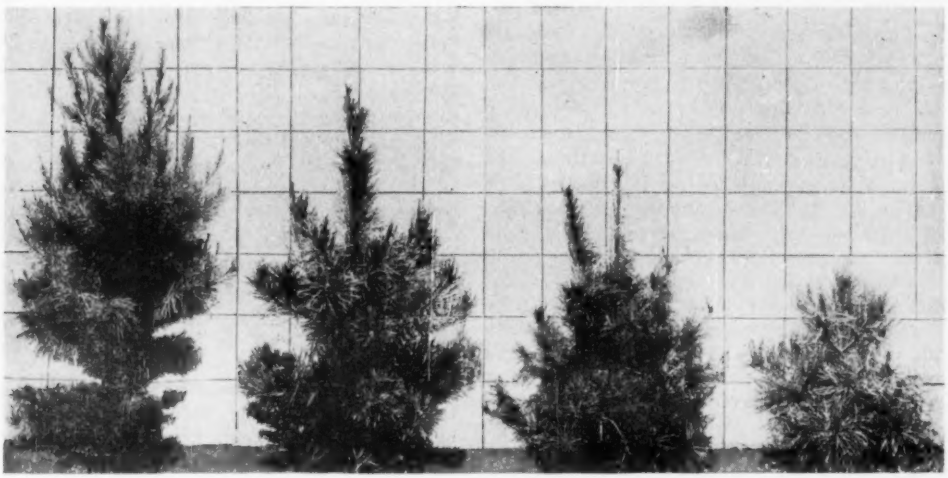

FIG. 3.—Comparative form and size of four species of pine after 3½ years in the field. All trees planted in the spring of 1943; photo July 25, 1946: A, *P. echinata*, B, *P. thunbergi*, C, *P. densiflora*, D, *P. ponderosa*.

Influence of Spacing on Growth of Red Pine in Plantations[1]

The spacing at which trees are planted appears to be one of the more important factors influencing their early growth rate and development. Although the general nature of the effects of various spacings is fairly well understood, the magnitude of those effects is not. For example, although too wide spacing is commonly conceded to lead to an excessively tapered bole, large branches, and slow natural pruning, it is not known just how far one may go towards providing maximum growing space and still get acceptable form and quality of product in many of our commonly planted species.

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MOST PLANTINGS of red pine in Pennsylvania have been put in at a spacing of 6 by 6 feet or less, with the aim of producing tall, straight trees with little taper. More recently, wider spacings up to 8 by 8 feet have come into use but with some misgivings as to the growth and development to be expected in comparison with closer spacings.

The four spacing plots on which this report is based were designed for comparisons of the growth of red pine (*Pinus resinosa* Ait.) at spacings of 5 by 5, 6 by 6, 6 by 8, and 10 by 10 feet. The plots, each 75 by 75 feet square, were located on an abandoned field with a fairly uniform slope and a shallow, sandy-loam soil. Planting was carried out in 1921 with 3-0 stock. In a previous report (*4*), the effects of spacing at 16 years were described and a superior growth rate of trees spaced 10 by 10 feet was reported. The present paper describes the condition of the plots at 25 years (Fig. 1). It should be emphasized that growth of plantations initially planted at various spacings should not be expected to be similar to that of dense stands thinned to equivalent spacings after having grown 15 or more years under crowded conditions (*1*). The condition of the shrub and herbaceous layers also differs from thinned stands, for even the 10 by 10-foot plot has become practically free of brush and weeds at 25 years (Fig. 1), whereas a stand opened to 10 by 10-foot spacing by thinning at 25 years usually is invaded by brush and weeds.

Diameter Growth

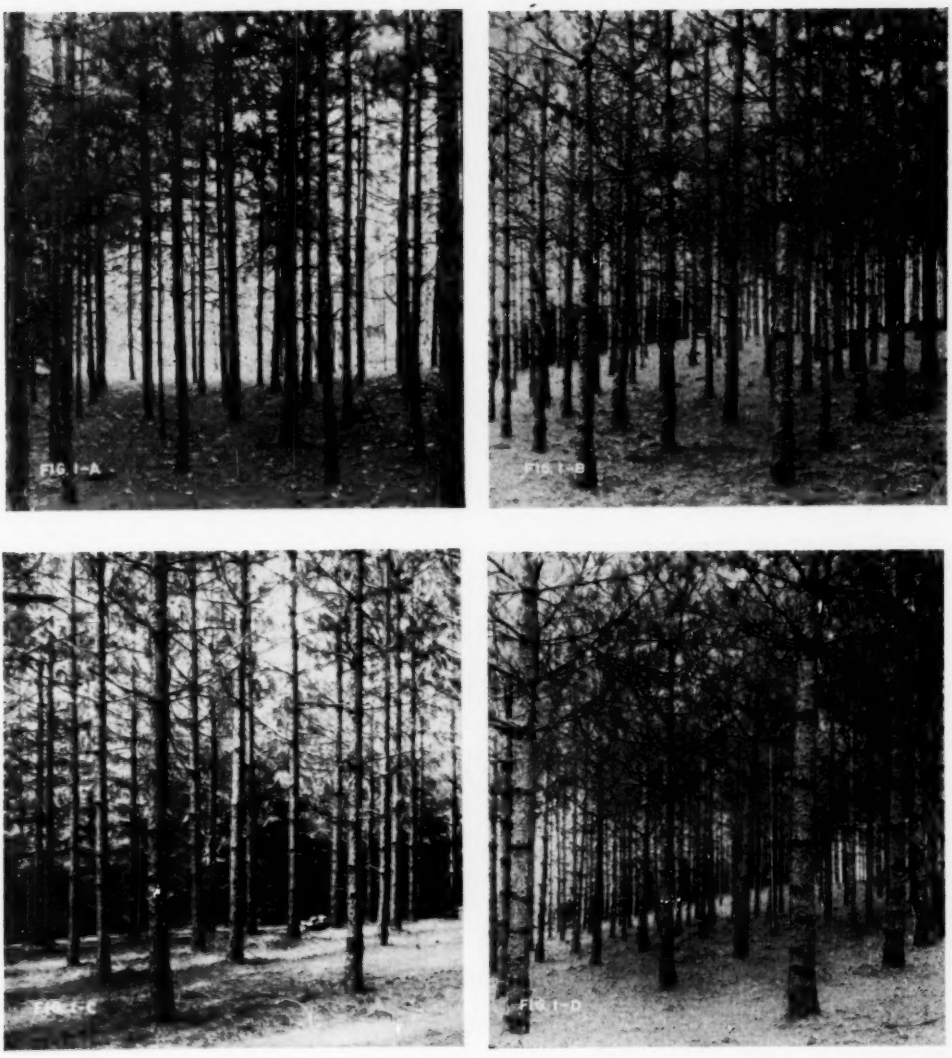
Through the twenty-fifth year the diameter growth of trees in the various spacing plots, as represented by the average d.b.h. (diameter at breast height, 4.5 feet) of all trees on each plot, has been consistently in favor of the wider spacings of 6 by 8 and 10 by 10 feet over close spacings of 5 by 5 and 6 by 6 feet (Table 1). The average d.b.h. of the 10 by 10 foot spacing at 25 years was 2.17 inches greater, and the 6 by 8-foot spacing was 0.82 inches greater than the usual 6 by 6-foot spacing. The 5 by 5-foot spacing had fallen far behind the two wide spacings with an average d.b.h. 2.76 inches less than the 10 by 10-foot spacing.

When the average d.b.h. for the four spacings was compared by means of block diagrams based on four measurements taken at 8, 11, 16, and 25 years (Fig. 2), all spacings were nearly equal up to about eight years of age. At 11 years the 10 by 10-foot spacing began to exhibit a marked superiority in diameter and this advantage was increased at 16 years; the 6 by 8-foot spacing, too, had forged ahead of the closer spacings by the sixteenth year. At 25 years a uniform increase from close to wide spacings existed between the average diameters for the plots (Fig. 2). Crown closure took place in the 5 by 5 and 6 by 6 spacings at about 11 years, but did not occur in the 6 by 8- and 10 by 10-foot spacings until between the fifteenth and twentieth years.

Although the plot layout was not designed for statistical analysis, simple group comparisons between plots by means of Fisher's *t*-test are of interest in that they indicated highly significant differences in diameter between all spacings.

Not only was the absolute rate of growth of the 6 by 8- and 10 by 10-foot spacing larger between 16 and 25 years than the closer spacing of 5 by 5 and 6 by 6 feet, but also the percent rate of increase was larger. The increase in diameter between 16 and 25 years of age based on diameters at 16 years for the 10 by 10 spacing was 29 percent; for the 6 by 8 spacing, 31 percent; for the 6 by 6 spacing, 22 per-

[1]Authorized for publication on March 16, 1949, as Paper No. 1512 in the Journal Series of The Pennsylvania Agricultural Experiment Station.



A, 5 by 5-foot spacing, average d.b.h. of 4.5 inches.
B, 6 by 6 foot spacing, average d.b.h. of 5.1 inches.
C, 6 by 8 foot spacing, average d.b.h. of 5.9 inches.
D, 10 by 10 foot spacing, average d.b.h. of 7.0 inches

FIG. 1.—Red pine spacing plots showing development of trees at 25 years. Photographs were taken at equal distances from the trees in central foregrounds so as to indicate relative tree sizes.

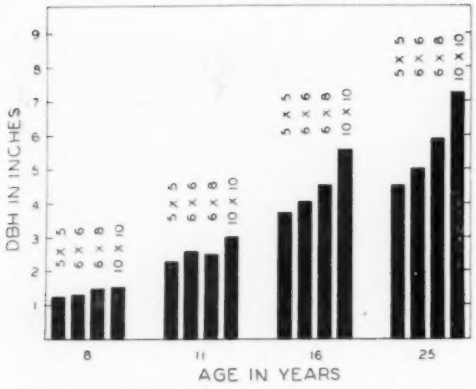


FIG. 2.—Comparison of the average d.b.h. of red pine on spacing plots at four ages.

cent; and for the 5 by 5 spacing, 20 percent. This indicates that the trees at wider spacings are more than maintaining the early advantage gained through possession of more growing space for crown and root development before crown closure.

When the average height and d.b.h. of the plots are compared with yield tables for red pine (*2*), the 6 by 6 and 6 by 8 spacings compare favorably with good sites at 25 years while the 10 by 10 spacings greatly exceed the expected average diameter and height given by yield tables.

Height Growth

The average heights for all spacings were similar for the first 16 years of growth (Table 1 and Fig. 3). At 25 years, however, the widest spacings, 6 by 8, and 10 by 10 averaged approximately 3.5 feet taller than the 5 by 5-foot spacing and 2 feet taller than the 6 by 6 spacing. These differences were found highly significant when subjected to Fisher's *t*-test for single group comparisons. This test is largely indicative here because the plots were not replicated.

The amount of top damage present in the spacing plots appeared to be directly related to stand density and affected the heights considerably. Because breakage from ice storms and from heavy falls of wet snow is a common occurence in central Pennsylvania, resistance to damage from such agencies has been regarded as a normal requirement of successful plantations. At close spacing of 5 by 5 feet, defects in terminal growth expressed as broken and crooked terminals were excessive and affected 358 trees per acre. At 6 by 6-foot spacing, top defects affected 86 trees per acre, at 6 by 8 feet they affected 58 trees per acre, whereas at 10 by 10 spacing they affected 39 trees per acre. The damage based on total number of trees in each plot was 38.5 percent in 5 by 5 spacing, and between 7.3 and 8.1 percent in the other three spacings.

There was no indication of stagnation at 25 years in any spacing. In the closer spacings, death and differentiation into dominant, codominant, intermediate, and suppressed crown classes had taken place; whereas at wide spacings of 6 by 8 and 10 by 10 all trees were living and could be classed as either dominant or codominant. At 6 by 6 spacing, 14 trees per acre

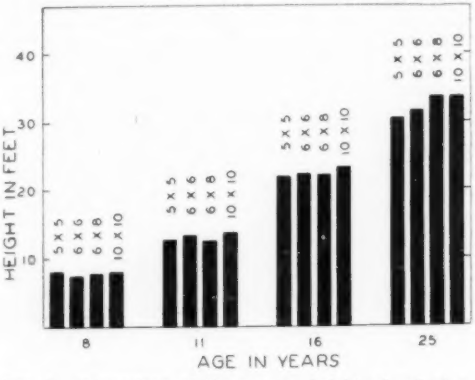


FIG. 3.—Comparison of the average height of red pine on spacing plots at four ages.

TABLE 1.—AVERAGE DIAMETERS AND HEIGHTS OF RED PINE ON UNTHINNED SPACING PLOTS

Spacing (ft.)	Average d.b.h. (inches)				Average height (feet)			
	8 years	11 years	16 years	25 years	8 years	11 years	16 years	25 years
5 by 5	1.25	2.25	3.72	4.47	8.0	12.8	21.9	30.4
6 by 6	1.35	2.59	4.16	5.06	7.5	13.2	22.1	31.7
6 by 8	1.45	2.49	4.49	5.88	7.8	12.5	22.0	33.8
10 by 10	1.51	3.01	5.58	7.23	8.1	13.7	23.2	33.8

had died from competition while at 5 by 5 spacing, 143 trees per acre had died. The average height for all spacings fell well above site index 60 indicative of best-quality sites for natural stands (*2*).

Basal Area and Volume

The basal areas of the spacing plots have changed markedly in relative amounts during the past 9 years (Table 2). The 5 by 5 spacing has fallen behind the 6 by 6 during that period with a percent increase for the entire period of but 24 compared with 61 for the 6 by 6 spacing. The next wider spacing, 6 by 8 feet, increased at approximately the same rate as the 6 by 6 spacing, but the 10 by 10, or widest spacing, increased 86 percent, the largest rate of increase for any spacing.

Increase in total cubic-foot volume of the spacing plots (Table 2) showed a trend similar to that of basal area. The 5 by 5 spacing plots increased at the slowest rate with a 6 percent growth rate as calculated by Pressler's formula for the past 9 years; until at 25 years their volume per acre had become smaller than either the 6 by 6 or 6 by 8 plots. The 6 by 6 and 6 by 8 plots both increased at the same growth rate, 8 percent; but owing to an initial advantage in volume at 16 years, the total volume of the 6 by 6 remained the greater at 25 years.

The 10 by 10 plot increased at the fastest rate, with a growth percent of 10 indicative of the rapid growth in volume at this wide spacing. Moreover, the volume in the 10 by 10 spacing has been laid on larger trees, one of the greatest values of this widest spacing. In the 10 by 10 spacing plot at 25 years there were 385 trees per acre in the 7- and 8-inch d.b.h. classes, with a volume of about 20.4 cords per acre; as compared to 166 trees per acre in the same d.b.h. classes with a volume of 6.6 cords at 6 by 8-foot spacing; 66 trees per acre with a volume of 2.9 cords at 6 by 6-foot spacing; and 28 trees per acre with a volume of 1.7 cords at 5 by 5-foot spacing.

Tree Form and Crown Development

Differences in number of stems per acre, or density, among the four spacing plots gave rise to marked differences in bole form as measured by the absolute form quotient

$$\frac{(D1/5 \text{ above } b.h.)}{d.b.h.}$$

At 16 years of age the form of all spacings had excessive taper typical of understocked stands (Table 2). Nine years later, the trees at 5 by 5 spacing had taken on the characteristic bole form of overly dense stands; namely, tall, slender boles with little taper that were in danger of breakage by snow or ice whenever exposed by cuttings. The 6 by 6 and 6 by 8 spacings at 25 years were of good form, indicating stands of proper density for producing trees with cylindrical boles and minimum taper. At 10 by 10 spacing, the trees at 25 years of age still had considerable taper and a form quotient characteristic of stands of low density. It is interesting to observe, however, that the forms of trees at wide spacings have improved considerably during the past ten years and show a trend toward form quotients typical of stands of desirable density.

Up to 25 years, natural pruning had not produced clear stems in any plots, although the death of lower branches had taken place up to 8.8 and 8.1 feet, respectively, in the 5 by 5 and 6 by 6 spacing plots as early as about 15 years. At 25 years the branches on the lower 16 feet of stem were dead at all spacings, although stand closure had not occurred until between 15 and 20 years at the wider spacings. The percentage of live crown in all spacings still remained at 45 to 55 percent of the total length of the bole at 25 years of age (Table 2). All spacings were still producing knotty wood in the basal log at

TABLE 2.—COMPARISON OF BASAL AREA, VOLUME, FORM, AND LENGTH OF CROWN OF EACH SPACING AT THREE AGES

Spacing (feet)	Total basal area per acre (Square feet)			Total volume per acre (Cubic feet)			Absolute form quotient			Percent live crown		
	11 years	16 years	25 years	11 years	16 years	25 years	11 years	16 years	25 years	11 years	16 years	25 years
5 by 5	7.2	132.4	163.6	521.5	1,432.2	2,493.9	.570	.623	.718	95.0	60.0	47.0
6 by 6	6.5	113.4	182.0	514.6	1,258.2	2,768.5	.571	.610	.686	100.0	63.0	47.0
6 by 8	4.4	99.9	160.2	396.9	1,187.0	2,598.7	.579	.615	.662	100.0	72.0	46.4
10 by 10	4.0	74.1	137.7	246.6	811.3	2,153.4	.552	.557	.662	100.0	98.5	53.4

25 years because of persistent dead branches; the size of knots in the 10 by 10 spacings were larger by about 0.3 inch than closer spacings. Although no further increase in size of branches will take place on the lower 16 feet of the bole, the larger branches on trees at wide spacings will persist longer and thus will reduce the amount of clear lumber produced unless pruned.

When the four spacings were pruned up to 17 feet at 25 years, marked differences naturally showed up in rates of pruning. For example, with ladder and hand-saw pruning, it took three times as long to prune 10 by 10 spacings as 6 by 6 spacings. This increased the cost of pruning 100 trees per acre from about $12 to $36 and is one of the disadvantages of wide spacing when production of clear lumber is an objective.

Development of Crop Trees and Effect of Thinning

Comparison of Crop Trees on Unthinned Plots

Although averages for all trees in each plot have been considered to be indicative of development of unthinned stands at various spacings, at least up to 25 years of age, comparison of the development of selected crop trees may be of even greater interest. Spacings have been compared, therefore, on the basis of the rate at which they permit a reasonable number of crop trees to develop. If close spacings in absence of thinnings will lead to development of crop trees of superior form at a growth rate approaching that of wider spacing, the close spacing should be preferred. Such a comparison (Table 3) should show the rate of development among the larger trees only, and except for possible utilization of trees cut in thinnings, it is those larger trees which the forester aims to bring through to form the final crop. It should be noted here that at 25 years, only the 6 by 8 and 10 by 10 spacings could yield pulpwood from thinning trees large enough to make such an operation profitable.

Crop trees were selected for measurement in each unthinned plot from among the dominant and codominant crown classes. They were fairly uniformly spaced, although a rigid spacing was not followed, and amounted to 200 trees per acre.

When those crop trees were compared, the heights were not markedly different, except for the height at 6 by 8 spacing which was 1.9 feet greater than the closer spacings and 1.2 feet greater than the 10 by 10. This small height difference between close and wide spacings indicates the usefulness of height of dominant and codominant trees as a measure of site quality. The average diameter of the crop trees in the plots increased with spacing increase; the 10 by 10 was much greater than its closest rival, the 6 by 8 spacing. Basal area and volume in crop trees naturally followed the same trend; that is, they increased as diameters increased up to a 10 by 10-foot spacing.

TABLE 3.—COMPARISON BETWEEN AVERAGE DIAMETERS, HEIGHTS, BASAL AREAS, AND VOLUME OF SELECTED CROP TREES ON UNTHINNED SPACING PLOTS AT 25 YEARS OF AGE. CROP TREES WERE SELECTED TO TOTAL 200 PER ACRE

Spacing	Average height	Average d.b.h.	Basal area per acre	Volume per acre
	Feet	*Inches*	*Square feet*	*Cubic feet*
5 x 5	34.0	5.48	33.4	549.1
6 x 6	34.0	5.72	36.2	593.5
6 x 8	35.9	6.56	47.2	789.3
10 x 10	34.7	7.85	62.3	987.1

The conclusion may be drawn, therefore, that wide spacing of 10 by 10 feet has in 25 years produced markedly larger crop trees than closer spacings. The trees are not taller but possess greater diameters and volume. This appears to be a fair comparison to use between plots where about 200 crop trees per acre are the aim of current management.

Effect of Thinning

When trees are planted as close together as in 5 by 5- or 6 by 6-foot spacings, early thinnings are generally needed, and, under intensive forestry, are carried out as a part of normal silvicultural practice. Therefore, one-half of the 5 by 5 and 6 by 6 spacing plots were thinned in 1940 at the age of 19 years in order to observe the effect of such treatment on rate of growth of remaining trees and to compare such growth with wider spacing plots that were not thinned.

The thinning removed trees of the suppressed and intermediate crown classes at an estimated cost of $14 per acre. In the 5 by 5 spacing plot the stand per acre was reduced from 1716 trees to 1113 trees; in the 6 by 6 plot from 1286 trees to 867 trees per acre. This resulted in a moderate thinning from below and the crown closed about five years after thinning. The stand was too small at the time of thinning to yield merchantable products.

The effect of thinning upon stand development as reflected by averages of all remaining

trees was to increase the average d.b.h. and height (Table 4). This is to be expected when the smaller trees are removed in any stand and is not indicative of growth caused by thinning. Of more significance is the comparison of the size of crop trees, for that indicates the effect of thinning upon the largest trees in the stand, a primary aim of thinning. When the size of crop trees in thinned and unthinned plots with 5 by 5- and 6 by 6-foot spacings are compared (Table 4) it is at once apparent that thinning caused no significant increase in height. The annual rate of diameter growth for the thinned and unthinned plots also showed but little effect of thinning, for the growth of the crop trees averaged 0.13 inches on the thinned 5 by 5 plots as compared to 0.14 inches on the unthinned plot. The annual growth rate for the thinned 6 by 6 plot was 0.16 inches as compared to 0.13 inches for the unthinned plot. In neither case had the crop trees in the thinned plots attained the size of those in the unthinned wider spacings of 6 by 8 and 10 by 10 feet.

This lack of increase in growth owing to thinning is to be expected, however, as the first six-year period after thinning is hardly enough time for the trees to have taken full advantage of the increased space provided by thinning. A second thinning should be given within eight to ten years after the first to make effective increases in growth. Even such thinnings should take out mostly smaller trees, an operation that is not profitable in small plantations in this area. In the meantime the wider spacings will have improved in form and quality without the additional cost of thinning.

At thirty years of age there should be a decided size advantage in favor of wider spacings; moreover, if the crop trees are pruned, as has been done on the plots, the central knotty cores will have been restricted to about 8 to 9 inches of the diameter in the first log. The closer spacings of 5 by 5 and 6 by 6 feet will also have knotty cores about 6.5 to 7 inches in diameter.

Summary

The growth and development of red pine spaced 5 by 5, 6 by 6, 6 by 8, and 10 by 10 feet in plantations have been studied over a 25-year period in central Pennsylvania.

Diameter growth of the two widest spacings has greatly exceeded that of the 5 by 5 and 6 by 6 spacings. A difference of 2.7 inches in average d.b.h. of all trees existed in favor of the 10 by 10 spacing over that of the 6 by 6 spacing at 25 years; a difference of 2.13 inches in d.b.h. also existed in favor of the crop trees of the 10 by 10 plot. A smaller, but also significant difference of 0.82 inches existed in favor of the 6 by 8 spacing over the 6 by 6-foot spacing.

While the two wider spacings produced stands of greater average height, this was caused in great part by less top damage in the wider spacings; the average height of crop trees alone was about the same for all spacings.

Although the bole form of trees at 10 by 10 spacing was inferior to 6 by 6 and 6 by 8 spacings at 25 years, the absolute form quotients have been changing and the wider spacings have been rapidly approaching the bole form of stands of good density. A lower quality of wood should be produced in wide spacings than in the 5 by 5 and 6 by 6 spacings, but this difference can be greatly reduced by early pruning.

The greater volume in 7- and 8-inch trees from the wide spacings gives them a decided advantage in volume production as well as giving promise of possible thinnings for profit at about thirty years. Early thinning in 5 by 5 and 6 by 6 spacings have not as yet developed

TABLE 4.—COMPARISON OF THINNED WITH UNTHINNED PLOTS AT 25 YEARS OF AGE. THINNING WAS CARRIED OUT IN 5 BY 5 AND 6 BY 6-FOOT SPACINGS WHEN THE PLANTATION WAS 19 YEARS OLD.

Spacing (feet)	D.b.h. (inches)		Height (feet)		Volume per acre[1] (cubic feet)	
	Average of all trees	Average of crop trees	Average of all trees	Average of crop trees	All trees	Crop trees
5 by 5 —thinned	4.88	5.66	31.7	33.8	2,230.8	570.6
5 by 5 —unthinned	4.47	5.48	30.4	34.0	2,493.9	549.1
6 by 6 —thinned	5.53	6.27	33.4	34.2	2,257.8	719.3
6 by 6 —unthinned	5.06	5.72	31.7	34.0	2,768.5	593.5
6 by 8 —unthinned	5.88	6.56	33.8	35.9	2,598.7	789.3
10 by 10—unthinned	7.23	7.85	33.8	34.7	2,153.4	987.1

[1]Volumes were determined by using the tables and correction factors recommended by Hicock and Kienholz (*3*).

crop trees equal in size to the wider spacings. Up to 25 years of age there were no signs of deterioration in the rapidly growing stands with wide spacings.

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Uses and Modifications for the "Moosehorn" Crown Closure Estimator

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THE "moosehorn," a new instrument developed in Canada, has been tested on eastern Oregon forested ranges and, with modifications, found useful for measuring percentage crown closure or crown cover. It is simple to use. All that is involved in many applications is to hold the instrument in a vertical position, look through a side aperture, and count the number of dots on a transparent upper surface that are covered by tree crown (Fig. 1).

The instrument was developed by the Air Surveys Division of the Dominion of Canada Forest Service, Department of Mines and Resources, for securing data that could be used in correlating actual cubic timber volume on measured plots with data from aerial photographs.[1] The ultimate goal was the preparation of stand volume tables. Because the instrument is similar in shape to a calling device used by big game hunters to attract moose, it was called a "moosehorn." Through the courtesy of the Dominion Forest Service, a model of the instrument was made available for use in constructing the replica which was used in the Oregon tests.

During the early stages of the trial, several modifications were found desirable to increase accuracy and ease of use. One of the first modifications of the "moosehorn" was the construction of a detachable dot template consisting of a single, central, rectangular field or grid of evenly spaced dots. By making the template detachable, one can readily adapt the instrument to several studies, each requiring a different number of dots or a different shape for the field of dots. If the instrument is to be used for only a single purpose, as in the Canadian survey, it is better to make the grid of dots directly on the underside of the stage.

It was found that red dots on the template provided good contrast with the green foliage. Red dots permitted direct count and tally of dots covered by tree crown. This eliminates dependence on a count of dots in the open spaces for a condition of good contrast.

Another modification was the attachment of a 2-way circular level to the underside of the stage. This reduced the amount of error introduced by tilt of the instrument and promoted uniformity in manner of observation between workers.

Other alterations of the "moosehorn" made the instrument better adapted to measurements at permanent observation points. These consisted of accessory devices designed to duplicate the instrument's position and the observer's field of view that existed at the time of the initial observations. The handle was replaced by a Jacob's staff adapter, a peep-sight ring and "cross hair" were fixed in the line of sight, and a small adjustable mirror with a black center line was attached to the upper edge of the instrument for periscopic uses.

The functions of these modifications are best explained by telling how the instrument is used in a study established to determine change in tree crown closure following logging. Each study area is sampled by a line of 50 permanent observation points spaced at intervals of 13.2 feet. The procedure for any single observation at a fixed point with the modified instrument is as follows:

1. The "moosehorn" is attached to a standard surveyor's Jacob's staff by means of the adapter and the instrument erected in a vertical position over the observation point.

2. The upper surface (template stage) of the "moosehorn" is adjusted to a true horizontal position while checking with the 2-way circular level through the side aperture.

3. With the aid of the small adjustable mirror, the dot template is oriented to the axis of the line of observation points. Orientation is secured when images of the observation-point markers, seen in the foresight, are superimposed on the center line of the small adjustable mirror. (If a foresight is impossible, a backsight can be made by rotating the instrument 180° upon the staff.)

4. The observer's line of sight through the

[1] Robinson, Mark W. An instrument to measure forest crown cover. Forestry Chronicle 23 (3):222-225. September 1947.

instrument is properly aligned when the image of the "cross hair" appears centered inside the peep-sight ring.

5. The number of dots on the template that are covered by the overstory are now counted and recorded.

Where temporary observation points will be used in a survey of percentage crown closure, the "moosehorn" readings can be made with the instrument supported only by the observer's hand. The only modification then used, for preserving similarity in manner of observations, is the 2-way circular level.

The number of observations required for an adequate intensity of sampling is a primary consideration as to the instrument's practicability. This problem was investigated by an exploratory study. The area used for the study was a tract of 173 acres of forest which had been delineated on an aerial photograph and verified on the ground as open coniferous timber, principally ponderosa pine. Ten sample areas, each one-quarter acre in size, were located at random on the tract. Within each sample area, 15 "moosehorn" readings were made at randomly located points. From these data it was found that for the timber type studied and sampling method used, a sampling error of 10 percent (one standard error expressed as percentage of the mean) for measuring crown closure could be achieved with only 9 observation points on each of 20 quarter-acre sample areas. This intensity of sampling on the tract studied would require about 1½ man-days of field work.

The instrument's basic operating principle is one of relative measure, and results are expressed as percent of crown closure. Such a system permits valid comparisons, as to degree of crown closure, between forest stands of widely different average canopy heights.

A question naturally arises as to how the instrument is to be used in uneven-aged stands where a big height difference exists between the canopy formed by small or young trees and the canopy formed by large or mature trees. The dot counts from each of these two types of canopies must never be combined. A separate tally can be kept for each of these types or the observations can be confined to a single canopy type.

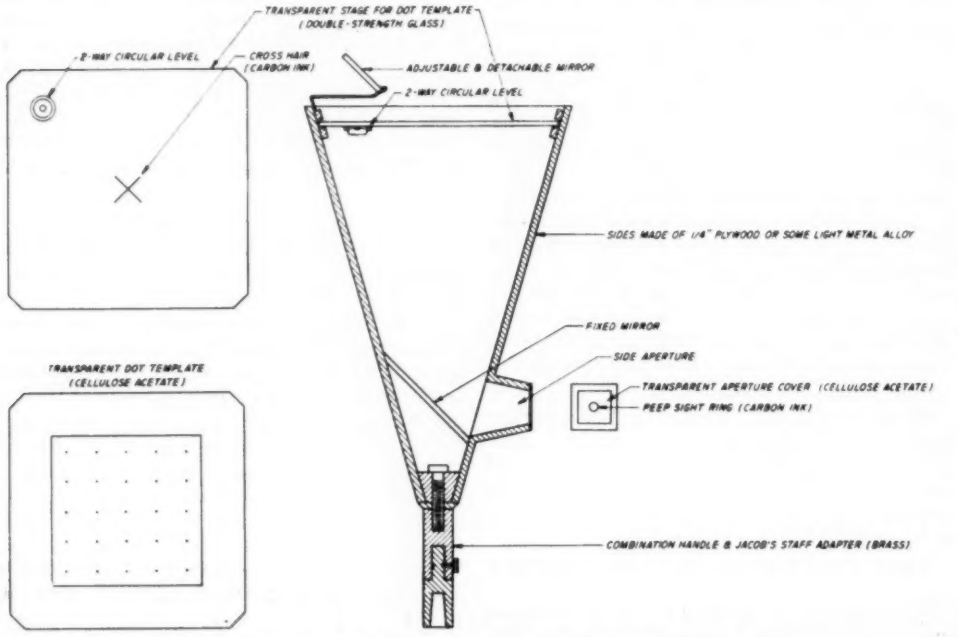
TRANSPARENT STAGE FOR DOT TEMPLATE (DOUBLE-STRENGTH GLASS)
2-WAY CIRCULAR LEVEL
CROSS HAIR (CARBON INK)
ADJUSTABLE & DETACHABLE MIRROR
2-WAY CIRCULAR LEVEL
SIDES MADE OF 1/4" PLYWOOD OR SOME LIGHT METAL ALLOY
FIXED MIRROR
SIDE APERTURE
TRANSPARENT APERTURE COVER (CELLULOSE ACETATE)
PEEP SIGHT RING (CARBON INK)
TRANSPARENT DOT TEMPLATE (CELLULOSE ACETATE)
COMBINATION HANDLE & JACOB'S STAFF ADAPTER (BRASS)

FIG. 1.—Sectional view and parts of the "moosehorn" crown closure estimator.

A problem which some may consider is the distortion of shape and area introduced by the slight oblique view of a forest canopy, as obtained with the "moosehorn." This distortion is of course nonexistent in the center of the field of view and greatest at the periphery of the field. Contraction of the dot grid, to one of smaller area than the Canadian grid, effectively reduced this type of distortion. The amount of remaining distortion of area is not considered great enough to prejudice the instrument's system of relative measure. In other words, the remaining deformation of shape and area does not bias the template dot count in favor of either dots covered or dots in the open.

With the modifications described here, the "moosehorn" was found to be a very useful instrument. It is simple to use and subject to less personal bias than any previously used methods for determining percentage crown closure. All workers conducting studies or projects that have phases related to degree of crown closure should find the instrument useful for both intensive and extensive types of application.

Notes

Low Forking in White Oak Sprouts May be Hereditary

The deliquescent type of growth of most hardwoods and the excurrent type of growth of most conifers are hereditary forms. Within a species there may be hereditary variations of growth such as the well-known example of bole form in Scotch pine. In oak, low forking is common and undesirable because it reduces the timber value of the tree. This article presents some evidence that low forking in white oak may be hereditary.

On the Lee Experimental Forest in Piedmont Virginia, 132 sprout clumps of two or more stems in a 25-year-old, even-aged, white oak sprout stand were selected for a study of thinning within sprout clumps. During the course of the study it was noticed that when one stem forked, other stems in the same clump were likely to be forked also. Only the two largest stems per clump were used in this study, because it was statistically impossible to analyze the data with different numbers of stems per clump. Furthermore, the influence of environment, such as crowding, is greater on the less dominant stems in a clump. Only stems definitely forked below 24 feet were classed as forked; all others were classed as straight or not forked.

The distribution of forking among the two largest stems in the 132 clumps was as follows:

	Number of clumps
Larger stem forked	30
Smaller stem forked	16
Smaller stem straight	14
Larger stem straight	102
Smaller stem forked	4
Smaller stem straight	98

In the 30 clumps in which the largest stem was forked, 53 percent of the next-largest stems were also forked. In the 102 clumps in which the largest stem was straight, all but 4 percent of the next largest stems were also straight. A chi-square test of the ratios on which these percentages are based showed that this difference was highly significant. Thus, when one stem in a clump was forked, the chances were good that the other stem in the same clump would be forked also. Likewise, if one stem was not forked, the chances were good that the other stem would not be forked either.

The stand was well-stocked, severe competition had begun, and diameter growth was decreasing. A sample of diameter growth for only the largest tree in each clump showed that for a 5-year period, 15 to 20 years ago, the average diameter growth was 1.18 inches. For the past five years it was 0.60 inches. The largest stem in each of the clumps averaged 5.0 inches in d.b.h., 36.5 feet in total height, and 10.3 feet in crown width.

In the stand were clumps with stems which had an excurrent type of growth suggestive of pine or spruce. There was no doubt about which was branch and which was leader. In other clumps with the deliquescent type of growth and ascending branches, there was no clearly defined leader, and at the extreme the type of growth tended toward dichotomy. Without doubt, environment affects the growth form to a great degree. Yet some trees not crowded had an excurrent type of growth with no tendency to fork, while others crowded severely were forked, and suppressed forks were numerous. In the stand as a whole, intermediate forms of growth of the familiar deliquescent type predominated.

This bit of evidence indicates that the tendency to fork low is probably inherited. Therefore, the recommended practice of eliminating low forked trees in thinnings or early cuttings of any sort is good for the present stand and for future stands, whether renewed by seed or sprouts.

ALBERT A. DOWNS,
Southeastern Forest Experiment Station.

International Rule Modified for Small Eastern Redcedar Logs

Because of the short, narrow boards permitted under the lumber grade specifications for eastern redcedar (*Juniperus virginiana* L.), mill tallies rarely agree with commonly used log rules. Table 1 indicates the overrun obtained with four common log rules during recent mill scale observations in the Arkansas Ozarks.

The gross lumber yields in the table were tallied from 266 mill-run 8-foot logs at two portable mills during 1947. In that year, these two mills sawed almost one million board feet of

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redcedar, about 90 percent of the amount produced in the Arkansas Ozarks.

The usual technique for sawing redcedar logs up to about 10 inches in diameter is to slab the log and cut nominal 1-inch boards until halfway through the log, turn the log through 180 degrees, and repeat the operation. Each board nominally 1 inch thick, 2 inches or more in width (83 percent heartwood on one face), and 2 feet or more in length can be edged to make a No. 2 Common and Better grade board.

Obviously, these utilization practices do not conform to the minimum 1-1/16"x 4" x 4' green

TABLE 1.—GROSS GREEN LUMBER YIELDS FROM 8-FOOT EASTERN REDCEDAR LOGS AND OVERRUNS IN PERCENT OF LOG RULE PREDICTIONS

Log d.i.b. small end (inches)	Number of logs	Mill tally[1]	Scribner International ¼" rule	Scribner decimal C rule	Doyle rule	Two-thirds square[2]
		Bd. ft.	*Percent overrun*			
4	8	6	---	---	---	20
5	42	9	80	---	---	12
6	62	12	20	140	500	9
7	65	17	70	70	240	13
8	42	22	47	120	175	16
9	26	28	40	40	133	17
10	12	35	17	17	94	17
11	9	43	23	43	79	19

[1]Average per log. All boards No. 2 Common and Better, except in the 11-inch diameter class, where an average of 3 b.f. of rotten boards was tallied per log. A negligible number of boards were culled for rot in the diameter classes below 11 inches.

[2]Board feet = $0.30D^2$ for 8-foot logs.

TABLE 2.—REVISED INTERNATIONAL ¼-INCH RULE FOR EASTERN REDCEDAR LOGS, ASSUMING THAT BOARDS 1"x 2"x 2' ARE MERCHANTABLE

Log d.i.b. small end	Log length 4 feet	8 feet	12 feet	16 feet
Inches		*Board feet*		
4	2	5	8	13
5	4	8	13	20
6	5	12	19	28
7	8	16	27	38
8	10	22	35	50
9	13	28	45	64
10	17	35	56	79
11	21	43	68	95
12	25	52	81	113
13	29	61	96	133
14	34	72	112	154
15	40	83	128	177
16	46	95	147	202

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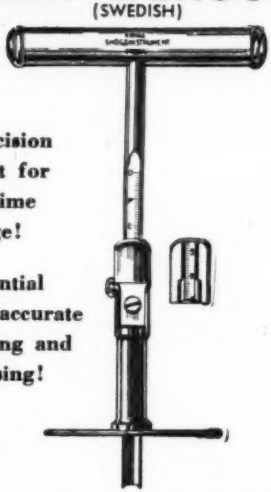

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board assumed merchantable by the International ¼-inch log rule. A simple revision of this rule, however, gives the values shown in Table 2, which are greatly improved predictions of the lumber actually cut from the log.

For a 4-foot section, the unmodified International ¼-inch rule may be written $V = 0.20D^2 - .64D$ or $0.20(D - 1.614)^2 - .52$. This formula allows a slab-edging collar deduction of about 0.8 inch, a scant shim deduction of 0.52 board foot (equal to a ⅜"x 4"x 4' board), a kerf deduction of ¼ inch per 1-1/16-inch green board, and a taper increase of ½ inch per 4 lineal feet.

It is reasonable to assume that for 1-1/16"x 2" x 2' minimum boards, the kerf-allowance ratio should not change, although one extra ¼-inch kerf line is deducted by the formula. Furthermore, loss from scant shims can be eliminated in sawing short logs by careful initial slabbing. Thus, instead of *deducting* 0.52 in the formula, *add* ¼"x 2"x 4', or 0.17 per 4-foot section for redcedar logs.

The major revision needed, however, is reduction of the slab-edging collar allowance. This is because the log need not be as deeply slabbed for a 2-inch face as for a 4-inch face, and because some boards shorter than 4 feet will be saved.

If it is assumed that only the slab-edging collar is changed by narrower and shorter board utilization and that in small, short logs the extra sawline and shim should not be deducted, the International ¼-inch rule can be revised for a 4-foot section as follows:

$V = 0.2(D - K)^2 + .17$ with ½-inch diameter increase allowed for each additional 4 feet. It can be shown that $K = 0.9$ checks the data most closely. Thus $V =$

$0.20D^2 - .36D + .33$ for a 4-foot section;
$0.40D^2 - .52D + .53$ for an 8-foot section;
$0.60D^2 - .48D + .70$ for a 12-foot section;
$0.80D^2 - .24D + .94$ for a 16-foot section; etc.

L. R. GROSENBAUGH and JOHN L. AREND,
Southern Forest Experiment Station.

Green Gold of the Mother Lode

The Michigan-California Lumber Company, operator of The Camino Tree Farm, greets the members of the Society of American Foresters on the occasion of their annual meeting and welcomes them to the Pacific Coast.

This is the centennial year of the great California gold rush. Following the discovery of gold at Sutter's mill in 1848, thousands of eager miners flocked to the new California "diggings" in the following year and became world known as Forty-Niners.

The yellow gold that inflamed the Forty-Niners is now found only in the deep mines — but the Green Gold, which attracted Sutter, and led him to build that early day mill, still grows on the slopes of the Mother Lode country.

The Camino Tree Farm contains 80,000 acres of choice California Sugar and Ponderosa Pine timber and young forest growth. We are striving to manage these lands on the basis of continuous forest production.

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Panchromatic vs. Infrared Minus-Blue Aerial Photography for Forestry Purposes in California

Classification of vegetation from aerial photographs is the foundation for present federal forest survey procedures in California. Solely from steroscopic study of the photos are obtained (1) the kind of vegetation cover or other condition occupying the land, (2) the age structure of tree stands based on the proportions of age classes present, (3) the densities of timber stands and other woody vegetation, and (4) the segregation of timber croplands from other lands. Other classifications made are indirectly related to the aerial photos.

Several studies reported in the literature have indicated that other film-filter-scale combinations are superior to the conventional panchromatic-minus-blue 1/20,000 photography for certain forestry purposes. Therefore, before obtaining additional aerial photography of forest lands in California a local test was performed to determine the relative ease and accuracy with which the necessary information could be extracted from various types of photography.

The film-filter combinations selected to compare with the standard panchromatic minus-blue photography were panchromatic green which H. C. Ryker found better than others he tested and infrared minus-blue recommended by S. H. Spurr and C. T. Brown, Jr. Other combinations were eliminated on the basis of the studies by these men, and the financial limitations.

Two photographic scales were used. One was the smallest (1/20,000) capable of yielding general identification of the required classification items on panchromatic minus-blue. The other was the largest (1/15,000) that appeared to be economically possible.

Since the classification work was to cover two individually distinctive vegetational regions in California, two sets of comparisons were needed, one representing the pine region of the interior and one the redwood region of the north coast. In selecting the actual locations of the photography every effort was made to cover the full range of timber stand conditions, vegetational types, and species composition common to each range. To accomplish this, three lines, each approximately seven miles long, were designated in each region. Each line was vertically photographed with panchromatic minus-blue and infrared minus-blue at 1/20,000 and 1/15,000 scales. Panchromatic green was used on one line in each region and only at the 1/15,000 scale since the reputed advantages in detail on that combination were not expected to be effective at 1/20,000. Standard procedures were followed in so far as practicable by the commercial agency taking the photography to simulate the results that would be expected in an ordinary photographic project.

The photos from all film-filter-scale combinations tested were first given intensive stereoscopic study both in the office and on the ground. After considerable preliminary study to become acquainted with the heretofore unfamiliar infrared minus-blue and panchromatic green combinations, identifications made on the different sets of photos were compared and then checked on the ground. As a final step identification ratings were assigned to each combination, based on a check made over the full set of photos, using regular survey classification procedures. Throughout the study possibilities for bias in favor of the panchromatic minus-blue photography resulting from longer and more extentive familiarity with that combination were recognized and, in so far as possible, minimized.

Immediately evident upon looking at the photos from both pine and redwood regions was the striking difference in their overall appearance. On the one hand were the panchromatic photos with variations in tree and shrub stands emphasized by the light background tones of the ground and herbaceous cover; on the other were the infrared photos with these variations obscured by a dark background. Between the panchromatic minus-blue and panchromatic green, the only noticeable difference seemed to be a slightly reduced contrast on the latter. Many individual vegetational features were, of course, more prominent at the 1/15,000 photo scale than at the 1/20,000.

For superficial use of the photos, panchromatic photography held a distinct advantage over infrared in bringing out important vegetational features. But what about detailed stereoscopic study, such as was being done on the forest survey? Would this difference then be significant? And which film-filter combination would best reveal the minute features upon which the desired vegetation classifications frequently depend?

The answers to these questions were not always in favor of the same film-filter combination. For the needs of the California forest survey, however, the panchromatic minus-blue had a definite total advantage over the infrared minus-blue. This advantage prevailed in both the pine and redwood regions. It also held at both the 1/20,000 and 1/15,000 photo scales. Between the panchromatic minus-blue and panchromatic green, what little difference did appear also favored the panchromatic minus-blue.

Those interested in the detailed analysis leading to these conclusions are referred to an illustrated article appearing in the June 1949, issue of *Photogrammetric Engineering*.

HERBERT A. JENSEN,
(Formerly) *California Forest and Range Experiment Station.*
ROBERT N. COLWELL,
University of California.

Pales Weevil Damages Plantations in Louisiana

The pales weevil, *Hylobius pales*, and a related species identified as *Pachylobius picivorus* have caused severe damage for two years in succession in certain first-year pine plantations on the lands of Southern Advance Bag & Paper Co., Inc., located in north central Louisiana.

Appreciable damage has occurred only in those first-year plantations on areas containing large amounts of freshly cut pine stumps and tops but no living pine reproduction other than the planted stock. These conditions were created by the occurrence of devastating forest fires during the late summer followed by clear-cutting and planting during the same fall and winter.

Damage was first noted in April of 1948. At that time specimens were collected and sent to the Bureau of Entomology and Plant Quarantine for identification. Most of the specimens submitted were identified as pales weevils and since they were collected at random over a rather wide area without recognition of the two species, it is believed that the other species was in the minority, if not insignificant on the ground. Further examination shortly afterward revealed that the weevils were present in all plantations with similar histories and in some areas were causing as high as 90 percent mortality, the amount of damage apparently being in relation to the amount of pine debris on the ground.

Following another bad fire season in the summer of 1948, in an effort to get pine seedlings started ahead of hardwood sprouts, and thinking that the weevil damage would not be so disastrous if recurrent, the company established four plantations under similar conditions. These plantations were located in the shortleaf-loblolly-hardwood type in Winn, Jackson, and Bienville Parishes, and were dispersed over an area of twenty-two miles. An investigation in May of 1949 revealed that the weevils were present in all these plantations and were causing high mortality in three.

The insects appear to start feeding on the tender bark near the buds and work downward going beneath the surface of the soil to strip the roots to a depth of four or five inches. The bark is removed completely in some cases and only in patches in others. Damage in almost every case is sufficiently severe to kill the plant. There seems to be no preference of species where loblolly and slash are planted in mixture.

During the spring of 1949, it was found also that the weevils were present in several areas which had been cut the previous fall and winter but which had been neither burned nor planted. However, in these areas the food supply, consisting of the young shoots and bark of wild seedlings and saplings up to ten feet in height, was apparently ample to supply the existing populations without heavy concentrations or serious injury to individual plants.

These observations make it logical to assume that the pales weevil is generally distributed over this locality and can be expected to appear in sufficient numbers to cause high mortality in first-year pine plantations established under the conditions described.

N. W. SENTELL,
Southern Advance Bag & Paper Co., Inc., Hodge, La.

Points of View

Background of the United Nations Conservation Conference

The United Nations Scientific Conference on Conservation and Utilization of Resources being held during August 17-September 6 at Lake Success, N. Y., has an interesting background. According to Gifford Pinchot in his book, *Breaking New Ground*,[1] a world conference on conservation was first proposed over forty years ago. He says that those who made the suggestion "believed that international cooperation between nations for the conservation of natural resources and for fair access to necessary raw materials would greatly reduce the danger of war and work powerfully for permanent peace."[2]

This first plan for a world meeting developed out of the White House Conference of Governors in 1908 and the North American Conservation Conference of 1909. The latter meeting, of which Gifford Pinchot was chairman, proposed that the President of the United States should invite all nations "to join together in conference on the subject of world resources and their inventory, conservation and wise utilization."[3]

President Theodore Roosevelt sent invitations to fifty-eight nations to meet at the Peace Palace at The Hague in September 1909. Thirty nations had already accepted when Taft, who succeeded Roosevelt as president, canceled the conference.[4]

But Gifford Pinchot did not give up his dream of a world conservation conference. He revived the idea at the end of the first world war, and again during the Hoover administration, without tangible results. In 1940, on Pinchot's initiative, the Eighth American Scientific Congress called for an Inter-American Conservation Commission to formulate "a general policy and specific program of action to promote the mutual conservation and prudent utilization of natural resources for the welfare of all nations, in the interest of permanent peace."[5] But little action resulted because of the war.

Finally in 1944 Pinchot gained the support of President Franklin Roosevelt for a meeting of "united and associated nations" to study the whole subject of conservation as a basis for permanent peace. "Roosevelt, unlike Taft, Wilson, and Hoover, grasped the full implications of the idea at once, received it with immense enthusiasm, and expressed the desire for rapid action. . . ."[6] He asked Pinchot to prepare plans for a world conservation conference and took a preliminary draft with him to his meeting with Stalin and Churchill at Yalta. But Roosevelt's death then intervened.

However, President Truman proved to be equally sympathetic to the idea, and in 1946 asked the United Nations Economic and Social Council to call a scientific conference on conservation and use of natural resources.[7] The word scientific is especially significant. For some unexplained reason Pinchot's original plan for a conference to develop international conservation policies and provide for fair access to natural resources had been shelved. Apparently the United States was not ready to face the problems that would have been involved in such a conference.

The Economic and Social Council adopted the American proposal in March 1947 and specified that the conference would be scientific rather than policy-making, that it would have no power to formulate recommendations, nor attempt to reach agreements and bind the governments. The sole purpose of the meeting would be to exchange information, ideas, and experience on conservation techniques, their economic costs and benefits, and their interrelations.[8]

These limitations on the scope of the conference are a disappointment to those who realize that conservation is blocked in many areas by international barriers and competition, and that a world conservation program is long overdue.

Certainly this summer's meeting serves a useful purpose in publicizing the need for conservation and in making scientific and technical information readily available to nations with little experience in this field. Lack of such knowledge delays conservation in many countries. But the

[1] Pinchot Gifford. Breaking New Ground. 1947.
[2] Ibid. Page 367.
[3] Ibid. Page 366.
[4] An item in New York Times, July 1, 1945, page 4, states that it was the hostility of Congress that caused Taft to cancel the conference.
[5] Pinchot, Gifford. Op. cit. Page 370.
[6] Ibid. Page 370.
[7] New York Times. September 17, 1946, page 14.
[8] United Nations, Department of Economic Affairs. United Nations Scientific Conference on Conservation and Utilization of Resources, Preliminary Announcement. Lake Success, N. Y. March 1949.

development of world conservation policies and programs need not await full knowledge of conservation techniques. They can move forward concurrently. Great advancement in conservation techniques has already been made through exchange of literature, scientists, and technicians. So the world conference on conservation policies which Gifford Pinchot worked for and which the world has long needed should not be further delayed.

H. W. WHITE,
Ogden, Utah.

Regulation of Land Use

Is regulation of land use necessary? Some think so. Edwin E. Ferguson for example, writing in the *Iowa Law Review*,[1] discusses regulation from the standpoint of soil conservation and points out how and why the voluntary effort is not adequate to meet this great problem. His regulatory approach to conservation is akin to mine, but I would go further and apply land-use regulation when any of our natural resources were involved, whether forest, range, or crop land use. One might say, wherever soil and water values are concerned.

The question of land-use regulation has been debated for several decades. I first participated in such discussions as related to forestry about thirty years ago. At one forum, I remember well one opponent saying that there would be no regulation of forest practices until there was also regulation of farm practices, but that no farmer would ever stand for regulation.

[1]Ferguson, Edwin E. Nation-wide erosion control: Soil conservation districts and the power of land-use regulation. Iowa Law Review. Vol. 34, No. 2, Jan. 1949, pp. 166-187.

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In conferring regulatory power on soil conservation districts, the state laws suggest the kind that can be enforced. They include such things as cultivation and cropping practices, retirement of critical areas, and comparable measures that permit a control of erosion. A referendum is usually necessary. This may call for a simple majority or up to 90 percent of those voting favorably. Enforcement would be under the police power. Compliance may be given a field check with authority to the district to perform the work if the owner fails to do so.

So far, only two cases of the use of this regulatory power have come to light. The Cedar Soil Conservation District in North Dakota adopted a range control ordinance to prevent overgrazing. This provided for determining the carrying capacity of range land and establishing a permit system to insure this capacity was not exceeded. The Warrington Dune Soil Conservation District in Oregon required land owners to undertake certain programs for sand-drift control.

That more use has not been made of the powers available to the districts has been laid to several causes: apprehension lest the voluntary program be retarded; fear of federal encroachment; postponement until opportunity for voluntary adoption of program has passed; etc. Only the last has any real validity, for many in the districts believe that emphasis on regulation should be delayed until all other forms of cooperation have been exhausted before compelling recalcitrant farmers to refrain from using undesirable practices.

This delay is founded upon the belief that every farmer should be given the opportunity to accept soil conservation principles. With so few district technicians available and so many farmers desiring a service that cannot be promptly granted, many of the supervisors believe the use of regulation should be postponed until all farmers in each district have been reached with the program. Obviously, many farmers lack the skill to apply the necessary measures, while to impose regulation without assistance would provide hardships on many. Then too, there is a feeling that with the subsidy payments made under the Agricultural Conservation Program, many farmers can be induced, at a price, to undertake simple conservation measures.

However, while regulation is not the complete panacea, it can be used to achieve parts of the program. Thus in North Dakota it provided the opportunity for the local people to protect themselves against overgrazing by outside interests. In Colorado, it enabled the local people to prevent absentee (speculators) owners from plowing up grass land and converting range land into a potential dust bowl. In this way, certain phases of the local problem were met even though the voluntary program was still far from being widely applied. Agricultural regulation is therefore a tool which need not be aimed at complete erosion control anymore than regulation of cutting practices would completely solve the forestry problem.

Great strides have been made in getting soil conservation practices applied on the nation's farms. The 150 million or so acres under farm conservation plans represent only 20 percent of the land in the districts and the planned work has been completed on only half of that. Yet we have some 460 million acres of good crop land left out of some 600 million originally, and all but 100 million acres is subject to erosion if used without protection. It appears evident that progress, great as it is, cannot meet the situation and that regulation, if only developed for part of the problem, is the only answer.

Such partial regulation can be prevention of overgrazing or of cultivating land too steep for the plow, prohibiting breaking new land for crops that is certain to become a dust-bowl, preventing plowing up and down hill, etc. Such practices are simple to apply, place no financial burden on the operator, yet will help get on top of the terrific job of overcoming soil loss.

Then too, there is need of regulation to prevent the dissipation of conservation work accomplished at a considerable expense both by the public and by the private owner, when a new owner enters the picture; and to make it possible to bring obstinate individuals into line so that their lands will not cause damage to the farms below them.

The parallel between soil conservation regulation and forest regulation is clearly evident to all who have considered the subject. Soil conservation regulation is now approaching a situation such as was experienced in forestry in the 1920's. The voluntary and cooperative approach, such as was advocated early and has been repeatedly tried with indifferent success in forestry, is now at its zenith in soil conservation work. There has been notable success in getting farmers to sign up to form districts. But, even where farmers have voted in the district, even in areas of high watershed value, where soil values

are high yet where erosion is widespread and damaging, from 5 to 20 percent and more of the farmers refuse to accept the farm plan, even after it has been worked out for them, and even those who adopt the plan, follow only some of the recommended practices.

Many in soil conservation work are now approaching the point where they are realizing that if soil conservation is to be adopted in the United States in time to save our land from destruction, we shall have to adopt something more urgent than a voluntary base. To many soil conservationists as to many foresters, there appears to be only one way to safeguard our resources, and that may lie in the adoption of some positive public control of private practice.

E. N. MUNNS.

More on Stagnation of Growth

I was greatly interested in Herman Work's letter in the May 1949 JOURNAL OF FORESTRY regarding stagnation of growth of young natural stands and plantations. He poses a problem which may, in large part, be resolved by a consideration of some basic principles of stand growth and of the chief reasons for thinning. Such an approach will by no means solve our thinning problems but should clear up some of the questions, stated and implied, in Mr. Work's letter.

There are three general statements that can be made as a basis for this approach. The first has perhaps not been rigorously proven, but much confirming evidence is available and it is based on the physiology of plant growth.

1. For a given species, site, climate, and approximate stand age the total cubic foot *current* growth per acre of new wood material is about the same for all stands regardless of stem density or diameter distribution, provided the site is fully occupied by trees and no soil or sunlight is "wasted." We say the stand is fully stocked, but that does not mean optimum stocking for the production of any given product. This point carries the concept that each site has a definite stand carrying capacity and will grow a rather definite amount of wood material if fully stocked.

2. The objective of silvicultural management is to place this growth capacity of the site on those trees most valuable for the *products we want to produce.*

3. Thinning should be postponed until a cut of the rougher and more ill-formed larger trees will pay for itself from the sale of products removed. Culls should be girdled or poisoned.

If we accept the above premises, it can be concluded that the current growth of new wood will not vary greatly whether the stand is stagnated or whether it is thinned, so long as holes are not opened up in the canopy. The *net* growth, however, will be increased after thinning in an overdense stand. The net growth on quality

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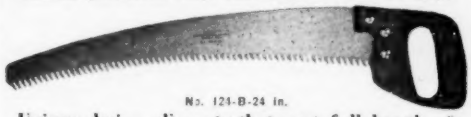

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trees may be increased several fold by a thinning designed to concentrate the growth capacity of the site on quality trees rather than letting it fall on all trees.

The two chief objectives of thinning are then (1) to save merchantable material that would otherwise be lost through mortality, and (2) to concentrate the growth capacity of the site on the trees best suited to fill the products objectives.

With these points in mind it is relatively easy to determine about when a thinning should be made. The age of the stand by itself is not much help. First of all, we want to save merchantable or near merchantable trees before they die. Secondly, we don't want to cut trees unless they will at least pay their own way. Crowns and growth rings furnish additional evidence of overcrowding. It is not natural or desirable that young trees should have weak crowns or narrowing growth rings. Where guides of desirable basal area are available, these can be used.

Mr. Work hints that most stands will "grow out" of a stagnated condition and that perhaps we don't need to worry about it after all. I agree that most stands will express dominance sooner or later, but I also think of the large amount of merchantable material that would be lost through mortality and of the lost opportunity to place the site growing capacity on the best trees.

Lest I unintentionally give the impression that we know all the answers about thinning of young stands or plantations, the following are listed as worthy of much more study: (1) optimum stocking *by sites* and desired products for the important commercial forest species, (2) economics of thinning including yield, frequency, methods, and time of thinning in relation to stand age and development, (3) the relations between original spacing of planted trees and thinning practice, (4) the relation between thinning and artificial and natural pruning, especially for plantations, and (5) the ecological and long time effects on the stand and site of various types of stand management and thinning practices.

LEON S. MINCKLER,
Carbondale, Ill.

A Showdown on Federal Forest Regulation

With the introduction, on May 10, 1949, of Senate bill 1820 "to provide for the establishment of forest practices for the conservation and proper use of privately owned forest lands, and for other purposes," by the Senator from New Mexico, former Secretary of Agriculture Clinton P. Anderson, the time has come for a showdown as to where the members of the Society of American Foresters stand on the question of federal regulation of private forest owners, large and small, throughout the length and breadth of the United States. We know the extent of small and farm ownership, and it is increasingly evident that the bulk of the large owners either are now or are on the way toward practicing forest production even to the extent of organizing operations on a basis of regulated cutting for sustained yield of plants and communities. We also know that the threat of impending federal control has stimulated certain states to attempt regulatory legislation, varying from control measures, enforced by law, to persuasive and advisory legislation through forestry boards.

We remember the past drives for federal forest regulation in the time of Gifford Pinchot, and under Acting Chief Forester Clapp, and the arguments that state regulation was incompetent, swayed by local interests opposed to it in principle, and unfair to competitors in adjoining states who were not required to adopt the measures and thus saved expense in a competitive market. We remember how the outstanding problem of the small woodlot owner was sidestepped by concentrating attacks on the big operators. We even recollect that at one time secret instructions were issued by the Acting Forester, requiring that subordinates give first priority to propaganda to influence the public to support the policy of federal forest regulation. We had hoped that better counsel might prevail and that the Forest Service would keep its hands off the states, on which rest the powers and duty of taxation, and of statewide fire protection. We had emphasized the cooperative approach, first advocated by Chief Forester Greeley, through the Clarke-McNary Law for forest fire protection, and running through the farm extension foresters' organization and education in general, with the chief responsibility resting on the states. We had sought to avoid the ever present danger of the tendency of the federal government to accompany subsidies with directive authority and had worked through the State Foresters' Association to that end, with some success.

Yet the underlying "policy" of the Forest

Service, instituted by Earle Clapp and carried on by his successor, Lyle Watts, though soft pedaled, was never modified nor dropped, and now emerges in its true form and significance in S. 1820, the statement of the former head of the Department of Agriculture, who would hardly have prepared this bill without approval of the Service. But whether or not it represents collaboration in preparation, the bill does express the exact principles repeatedly advocated by the Forest Service. Hence, action by the members of the Society on this bill would serve as a record of professional opinion on the principle of federal intrusion in this field, a record which is several years overdue.

Here is what the bill, known as the Forest Practices Act, contains, in brief. It confers upon the Secretary of Agriculture the power to establish forest practices on privately owned forest lands, citing 2½ pages of arguments to justify this course, the chief of which is the old, I believe, unsound or inconsequential one of competitive disadvantage, and citing the weapon of interstate commerce, and the dangers to watersheds and other stock arguments, all valid for *either* state or federal control. The Secretary is given power to carry out the act by any or all means, including cooperation.

In Sec. 5, a National Forestry Board is set up of 12 members, purely advisory, to pass on the adequacy of any state plan for regulation submitted to the Secretary for approval, or other matters relating to the act.

Sec. 6 contains the claws within the velvet paw. It is the old "compromise" policy, in which, instead of going all out and taking over directly, and at once, the control of all farm woodlots and other private forest land, it gives the states three years of grace in which to provide a state plan of regulation. Such a plan is not an independent action by the state. Instead, it will have to conform to whatever requirements are established by the Forest Service. The single designated state agency then becomes an appendage of the federal bureaucracy; first by complying with its ideas on silviculture and other management features; second by furnishing when required "from time to time" reports in any form, detail, and volume that may suit the desires of the Washington office; third, by submitting to inspection and investigation by Washington officials; fourth, by adopting rules and regulations enforcible by the state, which are approved by Washington.

The *quid pro quo* is of course financial assistance in carrying out the state plan. But note the steel fist concealed in the soft glove. At the end of three years, unless the state has by this time taken the federal yoke upon it, and satisfied the higher authorities, the Secretary at one stroke moves into the state and takes over. His agents now are there to enforce whatever rules he may make. The government has superseded state authority and local responsibility on 500 million acres of private land, with over four million small owners to boss around and tell what to do in their woodlots; not arguing, but telling them! This is the way to get things done in a democracy; quit shilly-shallying and use the mailed fist.

But that's not all. Next comes the first real indication of the thoughts back of this cooperative fund plan. "In such order [taking over] he may further provide for the withdrawal or curtailment for such period as he may deem appropriate of any assistance being extended under this act, *or any other act* administered by him to the state, or any agency or political subdivision thereof in furtherance of any other forestry program [such as farm extension forestry, the planting, anything] or in furtherance of any flood control, erosion control or other program the purposes of which in his judgment are related to the purposes of this act, and which in his judgment would be adversely affected by such inadequacy of the state plan or the administration thereof." This places the power and authority of the federal government over private land owners on a plane that puts it first in importance over all other existing agencies working for forest restoration, to the extent that the Secretary is given absolute authority to wreck any or all of these programs as the means of forcing states and millions of land owners to bow to federal authority.

After the Secretary of Agriculture has moved in on the forest owners large and small he makes his own rules of forest practice. He can create boards of a purely advisory character representing local interests. The rules will cover fire protection (what the private owners must do, independent of state forest fire services, which the government would in this case not control); insect and disease (same idea); and to provide for restocking with trees of desirable species and condition, either by natural reproduction or by planting; regulating the time to cut young stands, practicing a selection system if the Sec-

retary so orders, regulating grazing and logging methods, and if clear cutting is the silvicultural method used, getting a permit before cutting if over 40 acres is cut.

In Sec. 9, the Secretary can crawl out of responsibility for supervision of areas on which "because of size, location, dispersal, character of growth, noncontiguous, mature, or other relevant factors the application of the provisions of this act will lead to great practical difficulties or is not immediately necessary to the achievement of the purposes of this act." This blanket class permits of "discrimination" in enforcement. Political considerations, as affecting farmer and small owner, are not specifically mentioned as a reason for nonenforcement. But at any time the Secretary has the power to get tough. As a matter of fact, this section gives the Secretary blanket authority to designate by proclamation, any forest land that shall *not* be subject to his rules and regulations, when such rules are proclaimed.

The remainder of the law is concerned with the subject of working plans as an accepted substitute for regulation, provided they are approved by the Secretary, and with penalties, one of which will prohibit selling or disposing of any forest product that was produced contrary to any rule of forest practice, regulation or order of the Secretary, or to a working plan. What strange paths lead to totalitarian authority. What we need is a few signboards.

Well, there it is. Perhaps, by contrast to division of professional opinion on another recent public question, this bill *does* represent a principle that is of immediate professional interest to members of the Society of American Foresters. In this case, the Council should take a stand on it. Whether it does or not, it is my opinion that the approval or disapproval of this piece of legislation be submitted to the secret ballot of the members. Then at least we'll know something about where we stand on this age old fight for increased federal control of private forestry practice in America.

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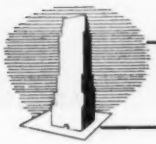

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We Present

Arthur A. Wood: Forest Officer and Public Servant

One of the first of the local citizens called upon to help round up and put under administration the national forests established in the southern Appalachians under the Weeks Law was Arthur A. Wood of West Virginia. His knowledge of men, land laws, land lines, and land values, plus his ability accurately to appraise and separate the fictitious from the real value of a property, and do it quickly and diplomatically, made him an extremely useful addition to the Forest Service when purchase of these Appalachian forests was inaugurated. His tact and judgment in dealing with landowners and in negotiating the early acquisitions, when the program was new and the public perhaps somewhat skeptical of its value, were valuable characteristics.

A man's abilities and character are better understood if we have knowledge of his early background. Arthur Alexander Wood was born August 24, 1886, and reared on a large farm nestled in the Lost River Valley of Hardy County, West Virgina. His parents, descended from Scotch-Irish settlers who developed this and the other fertile valleys of northeastern West Virginia, raised a large family of which he was the oldest child.

His father, Squire Wood, as he was affectionately known throughout the region, was father confessor, judge, and jury to the population of the Lost River and nearby valleys and to the often unruly inhabitants of the rugged mountains that separated them. An indication of the high esteem the Squire enjoyed is the fact that few disputes in his neighborhood ever reached the courts. They were settled on the Squire's front lawn, in the barn, on the wood pile, or wherever he happened to be. His reputation for fairness, honesty, wisdom, and broad knowledge of human nature as well as of the law spread over the valleys and the mountains until finally so much of the Squire's time was taken up adjudicating the difficulties of his neighbors that he had to build on office some distance from his home. This avoided cluttering up the house and yard with contentious males when his gentle wife was devoting her time to straightening out the troubles of their women folks, all in addition to the task of rearing a large family. So far as is known, the Squire never received compensation for his labor in behalf of his neighbors other than the satisfaction of contributing to the well being of the community.

Such was the environment in which Arthur grew up. As the Squire was compelled by age to relinquish his judicatory duties and the management of his farm, Arthur became the titular head of the Wood family that for so many years had guided the destiny of the Lost River Valley and its environs. In 1913 he married Ruth Chrisman, a resident of his home community. They had three sons, one of whom, a flier, was lost in World War II.

It was in 1911 that U. S. Forest Service officers appeared on the scene to undertake the acquisition of woodland in the Potomac purchase unit. This unit was later combined with the Massanutten and the Shenandoah units to form, in 1917, the Shenandoah National Forest, the name of which, about 1933, was changed to George Washington National Forest.

For the complicated procedure of land exam-

ARTHUR ALEXANDER WOOD

ination, surveys, title examinations, and acquisition, Arthur had a natural aptitude. He fitted smoothly into the organization and early showed a flair for getting a job done. The ink was scarcely dry on the land options before the fire control job in that area, subject to an annual burn of fifty percent, had to be undertaken. So energetically was this job tackled that long before the national forest was proclaimed, and responsibility for protection assumed by the Forest Service, the fire problem had been almost licked, and Arthur Wood had had an important hand in it.

Arthur was one of the early planners and proponents of the so-called warden system as applied to forest fire control on the national forests acquired under the Weeks Law. As assistant forest ranger, ranger, and later assistant supervisor on the Shenandoah National Forest, he helped develop and nurture this system that was eventually to be instituted in all the national forests of District 7, as the Forest Service regions were then known. District 7 at that time extended from Maine to Florida. The warden system was adopted later by many of the southern states.

As ranger and assistant supervisor, he was instrumental in developing policies and procedures in the marking, scaling, and marketing of special forest products with which the Forest Service at that time had little or no experience, i.e., tanbark, acid wood, and fuel wood. He submitted to the numerous government rules and regulations when they appeared to advance timber sales, but when they were inapplicable to to job in hand he wasted no time trying to get them changed. He was often successful.

Entering the Forest Service, without benefit of technical training, in a temporary capacity as forest guard on the Potomac purchase unit on April 21, 1913, his advances were rapid and well deserved. He was appointed assistant forest ranger in March 1914, forest ranger in August 1916, senior forest ranger in July 1924, assistant supervisor of Shenandoah National Forest in October 1925, supervisor of the Nantahala National Forest in October 1927, and supervisor of the Monongahela in May 1931.

Many younger foresters who now occupy responsible positions in industry, in state and federal services, and in our forestry schools received their training under Arthur Wood. Although not a professional forester himself, he early won the respect of the profession for his insistance on, and maintenance of, high standards of technical competence. His abilities, added to his sterling personal character, made of him a supervisor under whom it was an honor and a pleasure to serve. In recognition of his competence as a practical forester, he was accepted as a Junior Member of the Society of American Foresters in 1929, and was advanced to the full Member grade in 1935.

Arthur Wood retired from the Forest Service and from the post of supervisor of the Monongahela National Forest on June 30, 1949. What was once derisively called the Monongahela "national burn" is now a public forest of incalculable social and economic value to West Virginia, and, in a personal sense, a monument to his exacting administration and custodianship. He continues to live in Elkins where the constant influence of the surrounding rugged terrain and picturesque wooded slopes may be expected to keep his interest ever fresh and keen in the progress of forestry in his beloved Mountain State.

SEWARD H. MARSH.

Reviews

The Fire Patrol. By Dickson Reynolds. 192 pp. Thomas Nelson & Sons, New York. 1949. $2.

This is an action-packed story about two Canadian boys, Barry Elwell and his friend Bruce Todd. Both are intensely interested in conservation, and they plan to take a course in forestry at the university. They belong to an organization known as the Junior Forest Wardens, sponsored by the government and the Canadian Forestry Association, and learn how to live in the woods, plant trees, and fight fire using modern equipment. If Barry can earn money for part of his forestry education, and win the association's special badge for reporting and helping control a forest fire, his uncle has agreed to pay the rest.

Barry is a well-liked boy, and because he has a good knowledge of the woods he is offered a job as instructor at the Junior Forest Wardens' camp. Bruce also attends the camp, where they learn to identify trees, use forestry tools and equipment, and study forest protection methods. Upon their arrival home from camp, Barry meets his cousin, Ed Grover, forester for a big logging company in the interior. Because of their previous forestry training, he offers them jobs in the woods making fire trails, building bridges and lookouts, and spotting fires.

While on this job Barry discovers a forest fire and sends in the alarm. As there are few employees on duty as yet, Barry and Bruce pitch in to do men's work. Although the fire nearly spreads out of control, it is finally extinguished. During the height of the fire, Barry makes an heroic rescue of several families and a fishing party trapped by the flames. Later, an investigation shows that the fire was caused by a member of the fishing party, who pays a heavy fine for his carelessness.

Barry and Bruce receive the special badges awarded by the Junior Forest Wardens and look forward to their university studies and future forestry careers.

The plot is interesting, the story is well written, and the book is recommended for all boys who like adventure and the outdoors.

ALBERT CLEPPER.

Shrubs and Vines for American Gardens. By Donald Wyman. 442 pp. Illus. Macmillan Co., New York. 1949. $7.50.

This is a much needed book and fills a definite gap. We have all been waiting for a book of this type. There are many books on the market dealing with the larger aspects of landscape design, choice of plant material, planting and care. Most of these books only tell what will grow best in a given territory. Horticultural encyclopedias have that information listed under each species, but I do not know of any other book that tells in concentrated form in what particular zone of the United States and Canada each of the most attractive shrubs and vines will do well. This book tells it briefly and authoritatively. In this respect Dr. Wyman's book is original and most useful to everyone who wants to plant his home, or to the landscape architect, nurseryman, or gardener who wants to lay out the planting for others.

Dr. Wyman has singled out plants of particular value to the designer, basing his choice on hardiness to the locality, on color of the flower, and on fruit or bark. He summarizes these plants and tells in what particular locality they will grow. He even spares the reader from experimenting with those types which, in his experience, have proven less satisfactory. With Dr. Wyman's general list of recommended plants the landscape designer or amateur can now develop his plan and check whether the shrubs and vines that he observed elsewhere will do well in his own territory. He can check his nurseryman when he is offered a plant with which he is not familiar. Dr. Wyman's book is thus a sensible and practical book with conclusions drawn from long experience. It stresses the value of different shrubs and vines that have proven hardy in the many arboretums throughout the country and discourages exotics of mere botanical interest. It is equally practical when the author confines his lists to plants actually obtainable in commercial nurseries and when he stresses simplicity in spelling and choice of simple names.

The book includes special lists of value to the amateur as well as to the professional. Among these are lists of shrubs and vines in order of their blooming, fragrance, fruiting and color

of their foliage. His lists of shrubs for shady, dry, and wet places, for acid soil, for ground-cover, seashore, screens, windbreaks, and adverse city conditions are also useful.

To help the layman avoid fruitless experimentation with plants that are not as good as the best, Dr. Wyman adds a secondary plant list which should not be tried until the others have first been grown. In this way the reader is saved useless trials and failures. It is quite natural that Dr. Wyman should guide us in this direction because he enjoys the unique position of being the horticulturist for the Arnold Arboretum, one of the country's most outstanding arboretums where authentic records of many years are at his disposal. Furthermore, his work has put him in contact with the ninety other arboretums throughout the country, thus affording valuable data necessary for the preparation of his book.

While the present volume confines itself to shrubs and vines, the writer of this review hopes that in years to come Dr. Wyman will extend his book to cover trees as well as shrubs and vines.

The book is splendidly illustrated with halftones and colored maps.

J. J. LEVISON,
Consulting Landscape Forester,
Sea Cliff, Long Island, N. Y.

The Inside Story of UNRRA. By Marvin Klemme. 307 pp. Illus. Lifetime Editions, Inc., New York. 1949. $3.

Late in the recent war, the author joined UNRRA and was assigned to duty in western Europe. This is his highly personalized account of the operations of that organization, as he saw it, with particular attention given to the displaced persons of Europe.

Mr. Klemme is a professional forester, having studied at the Universities of Washington and Yale. During the summer of 1945 he was given charge of a large fuelwood cutting operation in the British zone of occupied Germany. His chapter "D.P. Forestry Operations" describes the manner in which some 8,000 D.P.'s were put to work on this project. He is critical of UNRRA for not having recruited more foresters, and of the British military officials for inefficient planning. In general he speaks well of the German foresters with whom he came in contact, and also of the Balt forest workers.

Although this account is admittedly one man's opinion only, it is nevertheless the opinion of a shrewd observer. He believes that the United States must cooperate in helping solve Europe's economic and social problems, but he also believes that a hard-boiled, realistic attitude is necessary in dealing with European politicians. Making no claim to be an expert in internationalism, he has unquestionably had experiences, however, that justify his attitude of skepticism about the ability of any international organization to solve Europe's problems or Europe's ability to solve her own.

This is not his first experience in foreign problems. He is the author of *An American Grazier Goes Abroad* of a decade ago.

HENRY CLEPPER.

Your Land—Surveys, Maps and Titles. By Fred C. Morris. 99 pp. Illus. Virginia Polytechnic Institute, Blacksburg, Va. 1949, 75 cents.

These United States of ours are a composite of many tracts of land. Ownership maps of any subdivision of land, be it town, city, county, or state, usually indicate a very complex pattern. This complexity is much more noticeable in the eastern part of our country than it is in the comparatively "younger" western areas.

The author has done a creditable piece of work in this book by keeping it on a nontechnical level and still touching upon and explaining the many points which apparently need reviewing and subsequent revision.

The physical phases of land surveys are analyzed in such a manner that the deficiencies which exist in too many land surveys become apparent.

One need not be a highly trained surveyor to understand and absorb the chapters on geodetic control points and plane rectangular coordinates. The layman will, undoubtedly, acquire a clear insight as to the problems which confront surveyors. The description of the Lambert intersecting cone and its development, together with the transverse Mercator projection and its development, are clearly presented.

Included in the chapter on plane rectangular coordinates is a rather complete description of the use of state coordinates, which, as the author puts it, "is the best method there is to establish permanent corners, and to eliminate the uncertainty of boundary lines."

The chapter on maps is extremely interesting. Included is a brief history of maps and their preparation. Considerable emphasis is placed upon the use of aerial photographs, the various uses of which are covered by numerous pictures

which convey the importance of this comparatively new development. The need for a central bureau of surveys and maps is cited; and this need is supported by twenty specific reasons which definitely indicate that such an organization is required, or at least its establishment should be seriously considered.

The ownership and the various methods of land transfer are explained in the chapter on land titles by registration. Included in this chapter is a complete description of the Torrens system. As stated by the author, "The two main objectives of the Torrens system, are to strengthen title and simplify transfer." Anyone who has had any contact with land transfer, will, undoubtedly, agree that most any change would be an improvement. The Torrens system—which, incidentally, has been accepted as law by nineteen states—as described by the author seems to offer the best possibility for putting land titles on a sounder basis. The establishment of a state department of land titles is proposed and its duties and responsibilities are outlined in detail.

This publication covers a subject which is practically as old as time. It is written in a manner which will stimulate the interest of both layman and engineer. Generally, the author refers to the State of Virginia in making suggestions for the establishment of various agencies necessary to improve land surveys, promote a mapping program, and to improve the status of titles to real estate. However, it is common knowledge that many other states are in need of this same improvement.

The purpose of this publication is to show that there are ways to improve land titles and surveys and this purpose is fulfilled in a thought-provoking manner.

GEORGE STENZEL,
University of Washington.

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Erfarenheter om anvandingen au Motorsågar (Experiences in Power Saw Felling). 87 pp. Illus. Norrlands Skogsvardsförbunds tidskrift. n:r 32-33. Stockholm. 1948.

This interesting publication consisting of two

From a small beginning in 1926 as a pioneer producer of sulphite pulp from West Coast Hemlock our company has grown steadily to a present day capacity of 375 tons.

This growth has been accompanied by refinement of process and increased efficiency in wood utilization.

Our auxiliary plant, which converts sulphite liquor—a former waste—into commercial alcohol, is one of the more important of a series of steps we have taken to create greater values from the forests.

Foresters attending the annual meeting of the Society of American Foresters in Seattle in October, who desire to visit our plant, will be greeted with welcome.

PUGET SOUND PULP & TIMBER COMPANY
Bellingham, Washington

WE HAVE BEEN AND ARE NOW PROMOTING THE USE OF WOODS PRODUCTS TAKEN FROM THINNING OPERATIONS ON TREE FARMS, CONSISTING OF FIR AND CEDAR POLES AND PILING, SMELTER POLES, MINE PROPS, FENCE POSTS, CAR STAKES, SPAR CROSSARM MATERIAL.

Timber Conserving by Wood Preserving.

CASCADE POLE COMPANY
TACOMA, WASHINGTON

articles, "Motorsågar och deras anvandning i svensk skogbruk" (Power Saws and Their Possibility in Swedish Forestry) by Gregor Caplan, and "Organisation au Motorsågamas anvandning" (The Organization of Power Saw Felling) by K. G. Zimmerman, merits the study of all persons interested in the use of power equipment in logging. English summaries are included.

Caplan gives some interesting results of actual studies in the use of power saws for felling. Up to the present time power saws have not been used for bucking. It is interesting to note in the brief history of power saws that the first attempt to develop a power saw was made in the United States in 1860. The first Swedish power saws appeared during the manpower shortage of World War I. One, a chain saw called "Sector," seemed to be quite practical. The other, called "Gerber," used a flexible band saw and never proved practical. Following World War I, German and English power saws were tried experimentally in Swedish forests. Labor shortages during World War II and immediately following the war gave further impetus to the use of power saws. American saws, such as the "Mall," "Atkins," and "Sally," Canadian saws such as "Hornet" and "Precision" have been tried. Sword type saws, two-man, seem to hold promise for felling, while two-man bow saws seem to be efficient for bucking.

Time studies of conventional logging methods indicate that felling and bucking operations accounted for 25-30 percent of the working time when the product was not barked, and 14 percent of the time when the product was barked, but required as much expenditure of energy as did the lopping and barking. Thus, while the actual amount of time saved through the use of power saws might not be great, the energy saved would be. The effect of the use of the saw would thus be both physical and psychological.

The use of power saws for felling is not recommended when the snow exceeds 50 cm. in depth. Manual felling proved to be more efficient in trees below 9 inches d.b.h. The organization of the work was found to be extremely important when power saws were used, since on well-organized jobs time lost in moving saws could be kept to the minimum. In general, only 75 percent of the working day was productive time for the saw.

Time saved through the use of power saws for felling varied with the size of trees cut, thus the sawing over manual felling in 10-inch d.b.h. trees was two percent, while in 25-inch trees the time saving amounted to 25 percent. An analysis of the cost of using power saws for felling showed that 70 percent was labor, 20 percent operating cost of the saw, and 10 percent interest and depreciation.

It was found possible to reduce the stump height as much as five inches with two-man sword type saws such as the Mall. The reduction in stump height increased the yield and made possible a reduction in the minimum d.b.h. where the saw could be used effectively.

The use of power saws required a reorganization of logging crews. When the product was not barked, one two-man power saw crew could keep 22 men busy with lopping and bucking in timber averaging 25 inches in d.b.h. In timber averaging 10 inches in d.b.h. the same crew would keep 11 men busy.

The use of power saws in Swedish forests is easily affected by economic conditions. The tables and figures merit detailed study by any one interested in the use of power saws.

Zimmerman briefly discusses 12 points to consider in using power saws for felling. His conclusions, based on ten years experience, are:

1. Forest areas should be large enough.
2. About 100 trees cut per hectar with an average d.b.h. of 10 inches is the lower limit for efficient power saw use.
3. Logging units should be adjacent.
4. Snow in excess of 50 cm. handicaps power saw felling.
5. A high type of labor is required.
6. Power saw operators should not do any undercutting, brushing, or snow removal.
7. Training is important.
8. Daily servicing and yearly check-ups should be assumed.
9. Spare parts should be easily available.
10. Provision should be made for transportation of the saw.
11. Instructions must be brief.
12. Power saw operators are paid by a combined hourly rate and piece rate.

It is interesting to note that so far the power saw has been used only in felling in Swedish forests. No mention is made of the possibility of skidding tree length sticks to a landing for bucking with a power saw. The publication is well illustrated and presents the material in a pleasing manner.

T. SCHANTZ-HANSEN.

Current Literature

Compiled by MARTHA MEELIG, *Librarian*
The New York State College of Forestry

Range Management Section Compiled by
FRANCES FLICK, *Library, U. S. Department of Agriculture*

General

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Logging and Milling

Home Timber Production. By Russell Meiggs. Illus. Crosby Lockwood & Son, 39 Thurloe St., S. Kensington, London, S.W. 7. 1949. 15s.

Recruiting and Training Labor for Woods Work. By F. C. Simmons. 16 pp. Illus. Northeastern Forest Expt. Sta., Upper Darby, Pa. 1949. Station Paper No. 24.

Pathology

A Comparison of the Pine-Oak Rusts. By G. G. Hedgcock and P. V. Siggers. 30 pp. U. S. Dept. of Agric. 1949. Technical Bul. No. 978. 10 cents (Govt. Print. Off.)

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Wood Technology and Utilization

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Society Affairs

Officers and Members of the Council—1948-1949

CLYDE S. MARTIN, *President*
Weyerhaeuser Timber Company,
P. O. Box 1645,
Tacoma 1, Wash.

CHARLES F. EVANS, *Vice-President*
U. S. Forest Service,
Glenn Building,
Atlanta 3, Ga.

HENRY CLEPPER, *Executive Secretary*
825 Mills Building,
17th Street at Pennsylvania Avenue, N. W.
Washington 6, D. C.

WILLIS M. BAKER,
Forestry Relations Division,
Tennessee Valley Authority,
Norris, Tenn.

CHARLES H. FLORY,
State Commission of Forestry,
Calhoun State Office Building,
Columbia, S. C.

RICHARD E. MCARDLE,
Forest Service,
U. S. Department of Agriculture,
Washington 25, D. C.

PAUL M. DUNN,
School of Forestry,
Oregon State College,
Corvallis, Oreg.

WILLIAM B. GREELEY,
West Coast Lumbermen's Association,
4444 White-Henry-Stuart Building,
Seattle 1 ,Wash.

DEWITT NELSON,
Division of Forestry,
Department of Natural Resources,
Sacramento 14, Calif.

JAMES C. EVENDEN,
Bureau of Entomology and Plant Quarantine,
U. S. Department of Agriculture,
Coeur d'Alene, Idaho.

CLARENCE S. HERR,
Woods Department,
Brown Company,
Berlin, N. H.

JOHN W. SPENCER,
U. S. Forest Service,
Post Office Building,
Denver 2, Colo.

Nominations Invited for President and Council in S.A.F. Election

All members are again reminded that the regular biennial election will be held next December 10. A president, vice president, and nine other members of the Council will be elected for the two-year term 1950-1951.

Any or all of the present Council may be renominated, provided they accept the nomination in writing. However, President Martin has announced that he will not be a candidate for reelection.

Membership on the Council is restricted by the Constitution to Members (formerly Senior Members) and Fellows. Any Member or Fellow is eligible to hold office who is in good standing and who accepts the nomination in writing and declares his willingness to serve if elected.

Each voter will have an opportunity to ballot on all candidates for office. Candidates for the office of president are voted on separately; the candidate who receives the highest vote is declared elected president, and the candidate who receives the next highest vote is declared elected vice president.

The nine remaining Council members are elected in accordance with the system of proportional representation. The procedure of proportional representation will be explained in a later issue of the JOURNAL. It is the system by which the Society has been electing Council members for the past decade.

How Nominations Are Made

The Constitution (Article VIII, Section 2) states the conditions under which nominations are made by petition.

1. Each petition shall name but one candidate.
2. All candidates must be eligible to hold elective office.
3. A petition shall bear the signatures of at least ten voting members who at the time of signing the petition are eligible to vote in the coming election. (Eligible voting members are Junior Members, Members, and Fellows in good standing.)
4. A voting member may not sign more than one nominating petition for member of the Council.
5. Petitions must be submitted by October 15.

The Society has no special form for submitting nominating petitions. They may be written as follows:

We, the undersigned voting members of the Society of American Foresters, hereby nominate John Doe, a Member (or Fellow), for the office of president (or member of the Council) for the two-year term 1950-1951.

All nominating petitions should be sent promptly to the Society's executive office. The names of all candidates will be announced monthly in the JOURNAL as petitions are received.

There must be at least two candidates for the office of president, and at least nine candidates for membership on the Council.

For President

Charles F. Evans, U. S. Forest Service, Atlanta, Ga. (Southeastern Section.)

For the Council

LeRoy D. Arnold, Indian Service, U. S. Department of Interior, Washington 25, D. C. (Washington Section.)

Lloyd P. Blackwell, Louisiana Polytechnic Institute, Ruston, La. (Gulf States Section.)

F. H. Brundage, Harbor Plywood Company, Portland, Ore. (Columbia River Section.)

D. B. Demeritt, Dead River Lumber Company, Bangor, Maine. (New England Section.)

J. Whitney Floyd, Department of Forest Management, Utah State Agricultural College, Logan, Utah.

Stanley G. Fontanna, Department of Conservation, Lansing, Mich. (Central States Section.)

Ralph W. Hayes, Louisiana State University, Baton Rouge, La. (Gulf States Section.)

Frank H. Kaufert, School of Forestry, University of Minnesota, St. Paul, Minn. (Upper Mississippi Valley Section.)

E. W. Littlefield, Division of Lands and Forests, New York Conservation Department, Albany, N. Y. (New York Section.)

Gordon D. Marckworth, College of Foresty, University of Washington, Seattle, Wash. (Puget Sound Section.)

Richard E. McArdle, U. S. Forest Service, Washington, D. C. (Washington Section.)

Stuart Moir, Western Forestry and Conservation Association, Portland, Ore. (Columbia River Section.)

DeWitt Nelson, Department of Natural Resources, Sacramento 14, Calif. (Northern California Section.)

Earl Porter, International Paper Company, Mobile, Ala. (Southeastern Section.)

Russell Watson, Manistique, Mich. (Wisconsin-Upper Michigan Section.)

The Coming Election of Fellows. How Fellow Nominations Are Made

All Members (formerly Senior Members) and Fellows of the Society are hereby advised that nominations for the grade of Fellow are now open. The election of Fellows will be held at the time of the Society's regular biennial election next December 10.

As defined by the Constitution (Article III, Section 6), "Fellows shall be foresters of outstanding achievement as leaders in responsible directive or distinctive individual work of a fruitful character. They shall be elected from the Members and shall be engaged in forestry work at the time of their election."

Significance of the Grade

The highest distinction that can be conferred on a member by the Society, this grade is awarded in recognition of outstanding achievement. Fellows do not pay increased dues; their dues are the same as those of Members.

At the present time the number of living Fellows is 49. Since the last election in December 1947, four Fellows have died: Carlos G. Bates of Minnesota; John C. Gifford of Florida; William G. Howard of New York; Aldo Leopold of Wisconsin; G. A. Pearson of Arizona; and Hugo Winkenwerder of Washington.

Nominations Are Made by Petition

The procedure for placing Members in nomination for the grade of Fellow is by petition. The Society has no printed form for this purpose. The petition may be typewritten thus:

We, the undersigned Members and Fellows of the Society of American Foresters, hereby nominate——— to the grade of Fellow for the regular election of 1949.

Remember these simple rules:

1. A petition may not name more than one candidate.

2. It must be signed by 25 Members or Fellows in good standing.

3. It should be accompanied by a factual, not eulogistic, biographical sketch of at least 200 words giving an account of his professional career and accomplishments.

4. It must be received in the executive office of the Society in Washington, D. C., not later than October 15.

The executive employees of the Society cannot be responsible for obtaining signatures on partially completed petitions or on petitions incom-

plete by reason of unacceptable signatures (that is, signatures of other than Members and Fellows in good standing).

Nominations Received

Up to the time of going to press with this issue, the following nominations had been received.

Evan W. Kelley, Montana.
E. I. Kotok, District of Columbia.
Woodbridge Metcalf, California.
Lee Muck, District of Columbia.
Dana Parkinson, District of Columbia.
W. B. Rice, Utah.

Election Procedure

Fellows are not elected by the membership at large, but by a board of electors which consist of all present Fellows and the present Council. (A Council member who is also a Fellow has but one vote.)

A form of preferential voting is prescribed by the Constitution and Bylaws by which the electors indicate first, second, and third choices. The system is described in Bylaw 21. To win election a candidate must receive an affirmative vote of not less than one-half the total eligible votes cast.

List of Fellows

The current roster of Fellows follows. The state in which each Fellow is domiciled and the year of his election are shown after his name.

Allen, Shirley W. Michigan. 1948.
Baker, Hugh P. Massachusetts. 1948.
Besley, Fred W. Maryland. 1940.
Butler, Ovid. Maryland. 1940.
Carter, E. E. District of Columbia. 1942.
Chapman, H. H. Connecticut. 1922.
Cheyney, E. G. Florida. 1944.
Clapp, Earl H. Maryland. 1930.
Coffman, John D. District of Columbia. 1946.
Dana, Samuel T. Michigan. 1935.
Eldredge, I. F. Louisiana. 1942.
Fischer, Arthur F. California. 1940.
Frothingham, Earl H. California. 1942.
Gill, Tom. District of Columbia. 1948.
Girard, James W. Oregon. 1944.
Granger, C. M. District of Columbia. 1946.
Graves, Henry S. Connecticut. 1918.
Greeley, William B. Washington. 1918.
Guthrie, J. D. Virginia. 1942.
Hall, William L. Arkansas. 1940.
Hawes, Austin F. Connecticut. 1939.
Hawley, Ralph C. Connecticut. 1942.
Holmes, J. S. North Carolina. 1939.
Hosmer, Ralph S. New York. 1932.
Illick, J. S. New York. 1946.
Jeffers, D. S. Idaho. 1948.
Kinney, J. P. District of Columbia. 1942.
Koch, Elers. Montana. 1940.
Korstian, Clarence F. North Carolina. 1942.
Lowdermilk, Walter C. California. 1948.
MacDonald, G. B. Iowa. 1944.
Marsh, R. E. District of Columbia. 1948.
Martin, Clyde S. Washington. 1948.
Mason, D. T. Oregon. 1948.
Mulford, Walter. California. 1939.
Munger, T. T. Oregon. 1946.
Peavy, G. W. Oregon. 1939.
Peck, Allen S. Colorado. 1946.
Preston, John F. Maryland. 1948.
Schmitz, Henry. Minnesota. 1940.
Show, S. B. District of Columbia. 1948.
Siecke, E. O. Texas. 1946.
Sparhawk, W. N. New Hampshire. 1946.
Spring, Samuel N. New York. 1939.
Watts, Lyle F. District of Columbia. 1946.
Winslow, C. P. District of Columbia. 1942.
Wirt, George H. Pennsylvania. 1948.
Zon, Raphael. Minnesota. 1918.

Preliminary Program and Information About the National Meeting of the Society of American Foresters

The 1949 national meeting of the Society of American Foresters will be held in Seattle, Wash., October 11-14. The headquarters will be the Olympic Hotel.

Descriptions of all scheduled activities follow. Members of the Society are welcome to invite guests to all functions except the Society Affairs session on the afternoon of Tuesday, October 11. Ladies are specially invited to attend the annual dinner on Wednesday evening, October 12.

No functions have been scheduled for Tuesday evening, October 11, which is held open for forestry school alumni meetings and other informal gatherings. However, the Committee on Local Arrangements cannot be responsible for arranging alumni functions, and the committee should not be asked to perform this service. Those wishing to schedule alumni dinners or meetings should deal direct with local hotels or restaurants. Numerous facilities for such functions are available in Seattle.

Committees for the Meeting

Two committees are in charge of the program and arrangements for this meeting.

The chairman of the Program Committee is Gordon D. Marckworth, College of Forestry, University of Washington, Seattle 5. The other members are Horace J. Andrews, William D. Hagenstein, C. R. Patrie, and L. T. Webster.

The chairman of the Committee on Local Arrangements is K. M. Murdock, Pacific Northwest Loggers Association, 4465 Stuart Building, Seattle 1, Wash. Other members are Charles S. Cowan, E. F. Heacox, J. K. Pearce, and H. L. Plumb.

Many Local Attractions

Within easy motoring distance from Seattle are many attractions for foresters, whatever their special interests. Recreational areas are to be found in the mountains, on the seashore, and in Puget Sound. For those interested in logging there are highlead, skidder, cat, truck, rail, gyppo, and other types of logging operations. Utilization specialists may see large and small sawmills, plywood plants, sash and door factories, laminating plants, pulp and paper mills, shingle mills, and other wood using industries. And there are farm forests, tree farms, cooperative sustained-yield operations, experiment stations, Indian forests, national and state forests and parks, and public and private tree nurseries.

The operators, owners, and managers of these diversified forests and industries will be glad to have Society members as visitors either before or after the scheduled sessions.

Organized field trips have been planned for Monday, October 10, and Friday, October 14. In addition, members attending the dedication of the Gifford Pinchot National Forest on Saturday morning, October 15, will enjoy a drive from Seattle of unusual scenic charm.

Special Bargain Trips in Yellowstone

Special bargain trips in Yellowstone National Park at one-third the usual cost have been arranged for Society members and friends by the Northern Pacific Railway. May and October are among the park's most colorful months. Although park hotels close because travel declines after schools open in September, the park itself does not close. Never are colors so vivid, hot springs and geysers more spectacular, and wildlife, especially big game animals, more numerous than in October.

Through arrangements with the Northern Pacific Railway, members and guests may take advantage of the Yellowstone side-trip leaving westbound from Chicago on October 6 or 7, and eastbound from Seattle on October 13.

Westbound, Yellowstone is only one of the features offered. Parties may visit the well-known Yakima Tree Farm near Ellensburg, Wash., where the administrators in charge will observe "open house" for those attending the meeting. Visitors may see timber stands and forest management activities typical of the tree farm system of the Cascade Mountains.

This tour has been sponsored by the Society and so planned that eastern foresters may obtain the utmost in enjoyment from their western trip. For details, members are urged to consult the Northern Pacific Railway's advertisements in the July or August issue of the JOURNAL. Special attention will be given parties desiring to travel together for companionship.

Preconvention Activities

Monday, October 10

1. Meetings of the Council; morning and evening.

2. Joint meeting of the Council and Section Officers; afternoon.

3. Field trip to Seattle forest products industries. An all-day tour will be made of representative Seattle plants manufacturing forest products. It will include visits to gang and band sawmills, plywood plants, shingle mills, wood preservation plants, and other diversified wood industries. The trip will be made by private automobiles or busses.

4. Field trip to Everett (Wash.) pulp industry. An all-day trip has been arranged for those interested in pulp products. At Everett, 30 miles north of Seattle, sulfite and soda mills will be in operation. Large and small hydraulic barkers will be demonstrated. The trip will be made by private automobiles or buses.

First General Session

Tuesday Morning, October 11

William D. Hagenstein, *Chairman*

Theme: Forestry in the Pacific Northwest.

1. Greetings and Welcome. Clyde S. Martin, president of the Society.

2. "Background of the Region." William B. Greeley, chairman of the Board of Trustees,

American Forest Products Industries, Inc., Seattle, Wash.

3. "Harvesting the Mature Crop."

By Federal Agencies. Dahl Kirkpatrick, Division of Timber Management, U. S. Forest Service, Portland, Ore.

By Private Operators. Delbert R. Taylor, Port Gamble, Wash.

Discussion.

4. "Airplane Seeding." George Schroder, forester, Crown-Zellerbach Corporation, Portland, Ore.

Discussion.

5. "Rehabilitation of the Tillamook Burn." John B. Woods, Jr., Oregon State Board of Forestry, Salem, Ore.

Discussion.

Society Affairs Session

Tuesday Afternoon, October 11

Clyde S. Martin, *Chairman*

1. Report of the President. Clyde S. Martin.

2. Report of the Executive Secretary and Managing Editor of JOURNAL OF FORESTRY. Henry Clepper.

3. Reports of Society Committees.

4. "Increasing Society Revenue Through Advertising in the JOURNAL." Lloyd Thorpe, advertising representative for the JOURNAL OF FORESTRY, Seattle, Wash.

5. "Shall Membership Qualifications be Amended to Admit to the Junior Grade Graduates in Wild Land Management Fields Other Than Forestry?" A Panel Discussion.

6. Open forum discussion of Society Affairs.

Division of Silviculture

Wednesday Morning, October 12

Philip C. Wakeley, *Division Chairman*

1. "Harvest Cuttings in the Southern Piedmont Region." D. J. Weddell, dean, School of Forestry, University of Georgia, Athens, Ga.

2. "Hardwoods versus Loblolly Pines." Kenneth B. Pomeroy, Southeastern Forest Experiment Station, Franklin, Va.; and N. T. Barron, Camp Manufacturing Company, Franklin, Va.

3. "Beetles Kill Four Billion Feet of Engelmann Spruce in Colorado." Arthur L. Nelson, assistant regional forester, U. S. Forest Service, Denver, Colo.

Since 1888

• Sixty years of harvesting and processing forest crops has permitted us to witness the restocking of tens of thousands of acres from which we removed the virgin growth—much of it already decadent when we reached it.

• Much of our new forest now has size enough to warrant introduction of forest practices not applicable to the old growth. We are particularly pleased to be partner in practical cooperative research with the Pacific Northwest Experiment Station in one of the first ventures of its kind.

• We are now making commercial thinnings in 35-40-year old timber on lands we logged in the 1900's. Our preliminary data are encouraging even under the stern test of immediate profit.

•

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4. "Sampling Methods in Tree Measurement Sales of National Forest Timber in the Northern Rockies." Donald W. Lynch, Northern Rocky Mountain Forest and Range Experiment Station, Spokane, Wash.

5. "A Look at Selective Cutting in Douglas-fir." Thornton T. Munger, Portland, Ore.; former director, Pacific Northwest Forest and Range Experiment Station.

6. "Recent Developments in Silvicultural Practices in the Douglas-fir Region." Leo A. Isaac, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

7. "Wood Quality in Relation to Site Quality of Second-growth Douglas-fir." Benson H. Paul, Forest Products Laboratory, Madison, Wis.

8. "The Work of the Forest-Soils Committee for the Douglas-fir Region." T. B. Plair, regional forester, Soil Conservation Service, Portland, Ore.

9. "Correlation between Certain Soil Characteristics and Site for Douglas-fir." Stanley Gessel, College of Forestry, University of Washington, Seattle, Wash.

10. "The Necessity for a Preplanting Soil Survey." Richard Tarrant, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

Wednesday Afternoon, October 12

F. S. Baker, *Chairman*

Symposum: "Examination of Ponderosa Pine Silviculture."

1. "Reproduction of Ponderosa Pine." George Meagher, Southwestern Forest and Range Experiment Station, Tucson, Ariz.

2. "Growth of Ponderosa Pine." Philip A. Briegleb, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

3. "Insect Problems in Ponderosa Pine." F. Paul Keen, U. S. Bureau of Entomology and Plant Quarantine, Berkeley, Calif.

4. "Financial Problems of Ponderosa Pine Silviculture." Thomas J. Orr, Jr., Weyerhaeuser Timber Company, Klamath Falls, Ore.

5. Discussions, led by the speakers.

6. Committee reports and business session.

Division of Range Management

Wednesday Morning, October 12

Lincoln Ellison, *Division Chairman*

Symposium: "Analysis of Grazing Capacity on National Forest Range Lands."

1. "Grazing Capacity Estimates and Range Conditions—1949 Concepts." Earl D. Sandvig, U. S. Forest Service, Denver, Colo.

2. "Sustained Grazing Capacity on Northern Rocky Mountain National Forests." Thomas Lommasson, U. S. Forest Service, Missoula, Mont.

3. "Photo Guides as Aids in Determining Range Capacity, Condition, and Utilization." Waldo E. Wood, U. S. Forest Service, San Francisco, Calif.

4. "Judging Range Condition and Trend in a Range Inventory Project in Oregon." George W. Kansky, U. S. Forest Service, Twisp, Wash.

5. "How Grazing Capacity of Mountain Range Lands is Affected by Range Condition and Usability." T. Dean Phinney, U. S. Forest Service, Ogden, Utah.

6. "Comparative Returns from Different Types of Land Use on Western Montana Forest Soils." Melvin S. Morris, School of Forestry, Montana State University, Missoula, Mont.

Wednesday Afternoon, October 12

7. "Grazing Use of Forest Lands in Interior British Columbia." E. W. Tisdale, University of Idaho, Moscow, Idaho.

8. "Immediate Effects of Logging on Forage Production." George Garrison and R. S. Rummell, Pacific Northwest Forest and Range Experiment Station, Portland, Ore.

9. "Factors Affecting the Grazing Use of Ponderosa Pine Ranges." Joseph F. Arnold, Southwestern Forest and Range Experiment Station, Tucson, Ariz.

10. "Some Aspects of Forage Yield Measurement." Charles E. Poulton, Oregon State College, Corvallis, Ore.

11. "Influence of Precipitation on Yield and Culm Production of Certain Southwestern Montana Range Grasses." Grant A. Harris, Northern Rocky Mountain Forest and Range Experiment Station, Missoula, Mont.

12. "Some Effects of Grazing Intensity on Growth of Northern Great Plains Forage Grasses." Merton J. Reed and Roald A. Peterson, Northern Rocky Mountain Forest and Range Experiment Station, Missoula, Mont.

Division of Private Forestry

Wednesday Morning, October 12

George L. Drake, *Division Chairman*

Joint meeting of Divisions of Economics and Private Forestry.

1. "Effect of Tax Regulations on Long Term Forestry Program."

2. Preliminary Report of Joint Committee on Forest Taxation. Ralph W. Marquis, chairman, U. S. Forest Service, Washington, D. C.

Discussion by Committee Members: Lloyd P. Blackwell, W. D. Hagenstein, E. G. Wiesehuegel, and E. T. F. Wohlenberg.

3. "Ownership Pattern and Its Effect on Forestry." Emanuel Fritz, School of Forestry, University of California, Berkeley, Calif.

Discussion.

4. "What Economic Studies and Surveys are Needed for Development of a Sound National Program of Insect and Disease Control?" S. A. Rohwer, assistant chief, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington, D. C.

Discussion. F. P. Keen, moderator, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Berkeley, Calif., Henry J. Vaux, Lee M. Hutchins, and J. J. deGryse.

Joint luncheon, Divisions of Private Forestry and Economics, Chamber of Commerce Building.

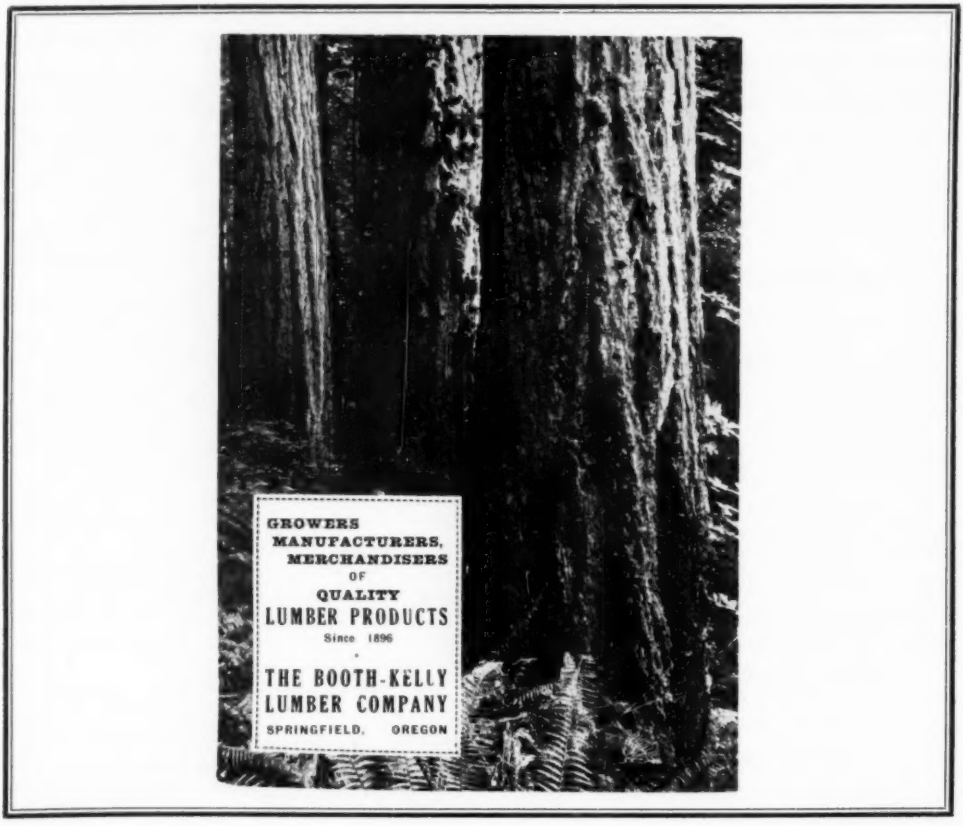
Wednesday Afternoon, October 12

Theme: "Growing Young Forests."

1. "Problems Confronting the Industrial Forester in the Management of Young Forests." George L. Drake, Simpson Logging Company, Shelton, Wash.

2. Discussion.

3. Business Session.



Division of Forest Economics

Wednesday Morning, October 12

Joint meeting of Divisions of Economics and Private Forestry. (See program of Division of Private Forestry.)

Wednesday Afternoon, October 12

Ernest Wohletz, *Division Chairman*

1. "Some Criteria for Judging Public Forestry Projects." S. Blair Hutchison, forest economist, Northern Rocky Mountain Forest and Range Experiment Station, Missoula, Mont.

Comments: Henry Vaux, School of Forestry, University of California, Berkeley, Calif.

2. "Determining Forest Land Ownership and Its Relation to Timber Management." Lee M. James, Southern Forest Experiment Station, New Orleans, La.

Comments: Henry G. White, U. S. Forest Service, Ogden, Utah.

3. Progress report of Committee on Scope and Method of Research in the Economics of Forestry. William A. Duerr, Southern Forest Experiment Station, New Orleans, La.

4. Business Session.

Division of Forest Products

Wednesday Morning, October 12

H. B. McKean, *Division Chairman*
L. N. Ericksen, *Program Chairman*

1. "Developments in Prelogging and Relogging, and their Relation to Management and Utilization Practices." Clarence W. Richen, chief forester, Crown-Zellerbach Corporation, Portland, Ore.

2. "Utilization of Low Grade Lumber of Douglas-fir." Phimister B. Proctor, technical director, Oregon Forest Products Laboratory, Oregon State College, Corvallis, Ore.

3. "Progress in the Manufacture of Pulp, Chemical, and Board Products from Mill and Logging Waste." Harvey D. Erickson, College of Forestry, University of Washington, Seattle, Wash.

4. "The Use of Impregnated Overlays and Hardwood Veneer Faces on Softwood Plywood Cores." John Ritchie, Douglas Fir Plywood Association, Tacoma, Wash.

5. "Developments and Trends in Forest Products Research." Frank H. Kaufert, chief, School of Forestry, University of Minnesota, St. Paul, Minn.

Wednesday Afternoon, October 12

Field trip to Puget Sound Navy Yard, Bremerton, Wash.

There will be a guided tour of the Navy Yard's boat shop where foresters may see the latest laminating techniques in the fabrication of keels, stems, and all structural parts in small boat construction. This shop, one of the most modern and completely equipped wood fabrication plants in the country, has the largest hot press ever built (40 feet long), dry kilns, treating retorts, and all types of wood working equipment.

This field trip, which will be taken by ferry boat, promises great scenic attractions as well as technical interest.

Division of Public Relations

Wednesday Morning, October 12

S. L. Frost, *Division Chairman*
J. C. Kuhns, *Division Vice Chairman*

1. "Applying National Advertising Principles to Forest Fire Prevention." Ervin F. Grant; Foote, Cone, and Belding, Los Angeles, Calif.

2. "Oregon's Keep Green Program." Arthur W. Priaulx, public relations director, West Coast Lumbermen's Association, Portland, Ore.

3. Forum: "How Can We Get More Tolerance in Forestry Public Relations?" Discussion leader, J. C. Kuhns, assistant regional forester, U. S. Forest Service, Portland, Ore.

4. "The Place of the Public Relations Division in the Work of the Society." Albert Arnst, Weyerhaeuser Timber Company, Tacoma, Wash.

Discussion.

Division of Forest Recreation

Wednesday Morning, October 12

J. V. K. Wagar, *Division Chairman*

1. "Coordination of Multiple Recreation Administration on Forest Lands." C. Frank Brockman, College of Forestry, University of Washington, Seattle, Wash.

2. "Recreation Problems Inherited from the C.C.C. in the Pacific Northwest." Fred W. Cleator, Parks and Recreation Commission, Olympia, Wash.

3. "Recent Experiments in Administering and Charging for Camping, Picnicking, and Summer Home Privileges on the National Forests."

4. "Can the Public Be Taught Nondestructive Nature Appreciation?" H. L. Bill, Mount Rainier National Park, Longmire, Wash.

Wednesday Afternoon, October 12

5. Business Session.

6. "The Objectives, Procedures, and Status of the National Recreation Policies Committee." Shirley W. Allen, School of Forestry and Conservation, University of Michigan, Ann Arbor, Mich.

7. "Federal Aid to Private Owners of Forest Recreation Lands Used by the Public."

8. "The Defense of Forest Recreation Areas Against Overambitious Irrigation, Flood Control, and Water Power Projects."

9. "The Administration and Protection of Forest Recreation Areas Subject to Overuse." E. P. Meinecke, San Francisco, Calif.; formerly with the U. S. Bureau of Plant Industry.

Division of Forest-Wildlife Management

Wednesday Afternoon, October 12

William H. Marshall, *Division Chairman*
Paul D. Dalke, *Program Chairman*

1. "Forest Wildlife Management in the Rocky Mountain Region." Ralph R. Hill, U. S. Forest Service, Denver, Colo.

2. "The Effects of Deer on Conifer Reproduction in Northwestern Montana." Lowell Adams, Fish and Wildlife Service, Missoula, Mont.

3. "Deer and Cattle Range Relationships." Odell Julander and Les Robinette, range conservationists, Intermountain Forest and Range Experiment Station, Ogden, Utah.

The Annual Society Dinner

Wednesday Evening, October 12

Toastmaster: Charles S. Cowan

Address: Hon. Arthur B. Langlie, Governor of Washington.

Entertainment.

Second General Session

Thursday Morning, October 13

George L. Drake, *Chairman*

Theme: Forestry in the Pacific Northwest.

1. "Forest Fire Control (1949)." P. A. Thompson, Regional forester, U. S. Forest Service, San Francisco, Calif.

Discussion.

2. "Management of the Cedar River Watershed (Source of the City of Seattle's Water Supply)." Allen E. Thompson, forester, Seattle Water Department, Seattle, Wash.

Discussion.

3. "Forest Management under the Cooperative Sustained-Yield Program." Paul M. Dunn, dean, School of Forestry, Oregon State College, Corvallis, Ore.

4. "New Developments in the Forest Products Industries." O. Harry Schrader, College of Forestry, University of Washington, Seattle, Wash.

5. "Promoting Forest Products." Harold Simpson, West Coast Lumbermen's Association, Portland, Ore.

Field Trips

Friday, October 14

1. White River field trip.

This all-day tour (150 miles round trip) will be made by chartered busses. The principal points of interest are the White River Tree Farm and the Snoqualmie National Forest. The tour will proceed via Enumclaw through reforested lands cut over years ago, and up White River to West Fork where typical Douglas-fir truck and railroad logging operations may be seen. There will be demonstrations of high climbing, felling, yarding, and transferring whole truck loads to railroad cars. Visits will be made to improvement cuttings, seed blocks, and areas of natural reproduction. A stop will be made at a camp ground in a setting of old Douglas-fir 200 feet high with one tree ten feet in diameter. With favorable weather, this will be a scenic trip of unusual attractions including close views of Mount Rainier. Field clothes are desirable though ordinary clothing will be adequate. Raincoats or overcoats, and either rubbers or heavy shoes, are suggested.

2. Cedar River field trip.

This all-day tour is scheduled to permit visiting foresters to observe the management of a large municipal forestry operation—the Seattle watershed on the headwaters of Cedar River. The watershed comprises 90,000 acres largely owned by the city, though 24,000 are in the Snoqualmie National Forest and 3,000 acres are in private ownership. Under management for twenty-five years, the watershed contains examples of artificial and natural regeneration, and large truck-logging operations. Commercial logging on all classes of ownership is so integrated that the annual cut does not exceed the sustained-yield capacity. The round-trip distance on this tour is 80 miles. Field clothes are de-

sirable but not necessary. Raincoats or overcoats, and either rubbers or heavy shoes, are suggested. Chartered busses will be used.

Dedication of the Gifford Pinchot National Forest

Saturday Morning, October 15

On Saturday morning, October 15, Society members will participate in the dedication of the Gifford Pinchot National Forest in the State of Washington (formerly the Columbia National Forest) the name of which was officially changed by Presidential proclamation on June 15. This will be an important historical occasion, and members are urged to attend as Mr. Pinchot was the founder and first president of the Society.

The dedication ceremonies will be held at 11 a.m. at La Wis Wis forest camp, near Packwood on State Highway 5, south of Mount Rainier, Washington. Those who are expected to take part in the ceremonies are Lyle F. Watts, chief of the Forest Service, and Horace J. Andrews, regional forester at Portland, Ore.; Governor Arthur B. Langlie of Washington; Cornelia Bryce Pinchot of Washington, D. C.; and Clyde S. Martin, president of the Society.

Hotel Accommodations

For this meeting the Olympic Hotel will be the headquarters hotel where the general sessions, the Society dinner, and most of the Division meetings will be held. But the Olympic will not be able to accommodate all members. Accordingly, rooms at other suitable nearby hotels have been reserved for those who plan to attend.

In order to assure that Society members and their guests may obtain satisfactory hotel rooms, a special Housing Committee will make the room assignments. The chairman is C. S. Cowan, Washington Forest Fire Association, 949 Henry Building, Seattle 1, Wash. All requests for hotel rooms should be made through Mr. Cowan, who will then notify each applicant well in advance of arrival as to the name and address of the hotel to which he has been assigned. A printed card has been provided for the convenience of members in making room reservations. However, the card need not be used if, when writing to Mr. Cowan, all information requested is sent him.

Those who expect to attend the meeting are

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FLOWER — VEGETABLE

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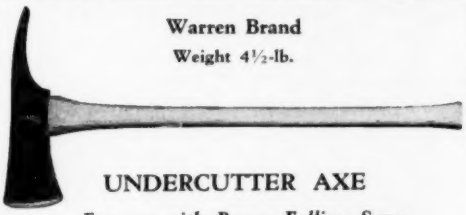

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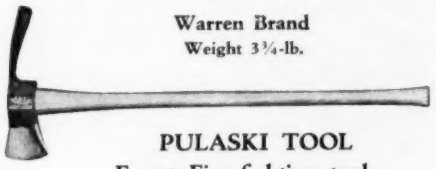

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urged to cooperate by requesting their room reservations promptly, preferably before September 15. The Society will assume no responsibility for lack of accommodations for those who bypass the Housing Committee and attempt to make reservations direct with hotels.

Because double rooms will be easier to obtain than single rooms, and because double rooms are cheaper per person than singles, members are urged to team up when possible.

Members should remember that the first general session does not start until Tuesday morning, October 11. Two field trips have been scheduled for Monday, October 10, for those arriving early, but no open meetings will be held that day. All are advised to consult the program before making reservations.

List of Hotels

The following Seattle hotels are available for this meeting. All rates quoted are for rooms with bath.

Olympic Hotel, 4th and Senaca Streets (the headquarters hotel). Single, $4.50 and up; double, $7.50 and up; twin-beds, $7.50 and up; suites, $12 and up.

Benjamin Franklin Hotel, 5th and Virginia Streets (10-minute walk from the Olympic). Single, $4 and up; double, $6 and up; twin beds, $7 and up; suites, $16 and up.

Gowman Hotel, 2nd and Stewart Streets (2-minute walk from the Olympic). Double, $6; twin beds, $7 and $8.

Hungerford Hotel, 1100 Fourth Avenue (2-minute walk from the Olympic). Single, $3.50; double, $4.50 and up; twin beds, $6 and up.

Mayflower Hotel, 4th and Olive Streets (5-minute walk from the Olympic). Single, $3.50 and up; double, $5 and up; twin beds, $6.50 and up; suites (2 persons), $12.

New Washington Hotel, 2nd and Stewart Streets (10-minute walk from the Olympic). Single, $4 and up; double, $6 and up; twin beds, $7 and up; single suite, $8; double suite, $10.

Roosevelt Hotel, 7th and Pine Streets (6-minute walk from the Olympic). Single, $4; double, $6; twin beds, $7.

Vance Hotel, 620 Stewart Street (10-minute walk from the Olympic). Single, $3.50 and up; double, $4.50 and up; twin beds, $5.50 and up.

Earl Hotel, 315 Senaca Street (½ block from the Olympic). Single, $3; double, $4; twin beds, $5.

TIMBER and PEOPLE

Two thousand people residing in Mason and Grays Harbor counties in Washington State are employed by the Simpson Logging Company.

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S.A.F. Consulting Foresters List to Be Published in January JOURNAL

November 1, 1949 is the deadline for consulting foresters to apply for listing in the Society of American Foresters' List of Consulting Foresters which is to be published next in the January 1950 JOURNAL OF FORESTRY.

Minimum requirements for listing are voting membership in the Society and the consultants designation of fields of specialization commensurate with his training and experience as shown in the official Society records.

Consulting firms will be listed if one or more of the partners or employees are members of the Society and capable of performing the services offered. In such cases, those individuals' names will appear in the listing.

Persons and firms in the S.A.F. List of Consulting Foresters which was published on pages 240-248 of the March 1949 JOURNAL and who are eligible for re-listing have been contacted by mail to obtain corrections or revisions.

Reply cards will be sent to presently listed consultants on August 31, 1949.

Members who are doing consulting forestry work and who have not been previously listed are invited to apply for inclusion in the S.A.F. List. They should provide complete information concerning address, specializations, and territory served, following the form used in the List of Consulting Foresters published in the March 1949 JOURNAL.

November 1, 1949 is the last date on which listings will be accepted for publication in the January 1950 List.

Texas and Louisiana Issue Directories

A "Directory of Foresters in Texas" was issued in June by the Texas Forest Service in cooperation with the Gulf States Section of the Society of American Foresters. All individuals are listed who are qualified for at least Junior Membership in the Society. Over 100 names are included.

The Texas directory is patterned after the "Directory of Foresters in Lousiana," now in its fourth edition. Over three-fourths of the 240 Louisiana foresters are S.A.F. Members, while nearly nine-tenths of the Texas foresters listed are members.

Coming Events

Ozark Section

The summer meeting of the Ozark Section will be held in southern Missouri, September 9 and 10. Details of the arrangements may be obtained from Robert H. Clark, Fordyce, Ark., chairman of the section.

Wisconsin-Upper Michigan Section

A meeting of the Wisconsin-Upper Michigan Section will be held September 16-17 at Muni-

S.A.F. Council Takes Field Trip

Pictured above are Council Members and state, private, and federal officials during a field trip on June 24 near Nemo on the Black Hills National Forest in South Dakota. The area was logged in 1902 by the Homestake Mining Company and is now being cut over again by the Warren-Lamb Lumber Company of Rapid City.

From left to right are: Gene Lepley, staff assistant, Harney National Forest; Orlo M. Jackson, district ranger, Black Hills National Forest; Harry Woodward, state forester of South Dakota; Clarence S. Herr and Charles H. Flory, Council Members, S.A.F.; Henry Clepper, executive secretary, and Clyde S. Martin, president; James Estes, manager, Timber Department, Homestake Mining Company; William B. Greeley and Paul M. Dunn, Council Members, S.A.F.; Charles F. Evans, vice-president.

sing, Mich. R. H. Ewalt, Cleveland-Cliffs Company, Negaune, Mich., is chairman of the Committee on Arrangements.

West Virginia Chapter

The West Virginia Chapter of the Allegheny Section will hold its summer meeting at Jackson's Mill, September 22. E. H. Tryon, Division of Forestry, West Virginia University, Morgantown, W. Va., is in charge of the program.

Association of State Foresters

The annual meeting of the Association of State Foresters will be held in Hot Springs, Arkansas, October 5-7. Fred Lang, state forester, Little Rock, Ark., is in charge of arrangements.

American Forestry Association

The annual meeting of the American Forestry Association will be held October 10-13. Primarily a field meeting, those in attendance will convene at Wheeling, West Virginia for a luncheon and trip through Oglebay Park. On October 12 there will be a trip to the Muskingum Watershed Conservancy District in Ohio, with a night stopover in Akron. On the 13th trips have been scheduled to Louis Bromfield's Malabar farm and the soil conservation research station at Wooster.

For additional details write to the American Forestry Association, 919 17th Street, N. W., Washington 6, D. C.

Society of American Foresters

The national meeting of the Society of American Foresters will be held in Seattle, October 11-14, at the Olympic Hotel. The preliminary program is published elsewhere in this issue.

Canadian Society of Forest Engineers

The annual meeting of the Canadian Society of Forest Engineers will be held in Toronto, October 24-26. Murray Morison, Department of Lands and Forests, Toronto, is chairman of the Meeting Committee.

Central States Section

The annual meeting of the Central States Section will be held at Cairo, Ill., October 27-29. Reservations should be made through Don Winters, Box 134, Murphysboro, Il.

Northern California Section

The Northern California Section will hold its annual meeting in San Francisco, on December 3, at the Sir Francis Drake Hotel.

The Section secretary is Rudolph Grah, 23 Forestry Building, University of California, Berkeley 4.

All Georgia Graduates Elected

Both numerically and on a percentage basis, more 1948 graduates of the School of Forestry at the University of Georgia have been elected to Junior Membership in the Society of American Foresters than from any other school.

Through May 31, 1949, all 57 of Georgia's 1948 graduates had been elected.

More than 40 percent of the 1948 forestry graduates of the following schools had been elected to Junior Membership by May 31, 1949: University of Florida, Purdue University, North Carolina State, and West Virginia University.

Kentucky-Tennessee Section Meets in Memphis

Some forty Kentucky-Tennessee Section members and guests opened their summer meeting with a breakfast at Memphis' Hotel Peabody, June 24. Martin Zook, agricultural director of the Memphis Chamber of Commerce and manager of the "Save-enrich Our Soil" competition sponsored by the *Press-Scimiter*, welcomed the foresters, pointing up Memphis' position as the hardwood center of the nation. He also advised them that a division of farm forestry awards was to be added to the SOS competition in the near future.

First stop after breakfast was the E. L. Bruce Company plant. C. Arthur Bruce, executive vice-president, met the group and then turned them over to guides who showed them through the flooring plant, Bruce laboratory, and Bruce doozet and cleaner plant. Feature of the trip was the manufacture of pre-finished flooring.

Lunch was served in Overton Park amid 640 acres of virgin timber. In a volume estimating contest, a 100-foot steel tape donated by Reichman Crosby Machinery Company was won by James W. Hamilton, assistant county agent in forestry, Benton County, Tenn. He estimated four trees at 5700 board feet. They actually contained 5869 feet (International).

In the afternoon the group went through the plant of Nickey Brothers, Inc. Here they watched the production of veneer, plywood,

flooring, and dimension. They also visited the hardwood inspection school which now has study rooms and yard facilities at Nickey Brothers. This school, designed to train qualified hardwood lumber inspectors, is sponsored by the National Lumber Manufacturers Association and the Memphis Lumbermen's Club. Also seen at Nickey Brothers was the production of pres-to-logs from dry mill waste.

That evening the Section had a joint dinner meeting with the Memphis Lumbermen's Club. Approximately 100 attended. Armour C. Bowen, Lumbermen's Club president, presided. Guests included members of the Memphis Park Commission, and Chairman John Vesery spoke briefly about the Memphis arboretum. R. A. Colgan, Jr., executive vice-president of the National Lumber Manufacturers Association, was the principal speaker. His theme: "Trees can now be grown profitably as a crop."

The following morning, Section members heard Dr. Reavis C. Sproull, assistant director of the Southern Research Institute, discuss the developments in the use of wood waste. According to Dr. Sproull, "Utilization of wood waste is the most challenging problem of the forest products industries."

The meeting was concluded with a screening of Southern Hardwood Producers new color film *Southern Hardwoods—Yours Forever.*

RUSSELL STADELMAN,
Program Chairman.

Lower Michigan Chapter Formed

Thirty-three members of the Society located in the Lower Peninsula of Michigan met on June 17 at Michigan State College at East Lansing to form a chapter.

Officers elected were chairman, Norman F. Smith, Michigan Department of Conservation, Lansing; vice chairman, Alex Panshin, Forestry Department, Michigan State College, East Lansing; and secretary-treasurer, Herman Kranzer, American Box Board Company, Filer City.

The authorization for the chapter was presented to the group by S. G. Fontanna, representing the Council of the Central States Section.

Well over 100 Society members reside in lower Michigan and it is the aim of the chapter to foster close personal and professional relationships between individual members and the organizations they represent. The chapter will be the medium through which all members and particularly younger ones can participate in Society affairs, and in which there should be a free interchange of ideas on broad as well as local forestry problems at informal gatherings.

Committees appointed were Meeting and Program, Fred H. Haskin, Fife Lake, and John Fields, East Lansing; To Determine Limits of Chapter Membership and Study Bylaws, Alex Panshin and Earl Hodgkins, East Lansing; Society Affairs, Shirley Allen and John Carow, Ann Arbor.

Following the formalities attending the organization of the chapter Mr. Fontanna, president of the Association of State Foresters, discussed federal legislation affecting state and cooperating forestry. Professor Allen, past president of the Society, presented and discussed several current problems confronting the Society and urged "tree roots" participation by such groups as ours in Society affairs as well as in professional forestry matters.

NORMAN F. SMITH,
Chairman.

Elections to Membership

Affiliate

Jacobs, P., N. H.

Associate

Clarke, S. J., Wash.
Dietz, Martha A., D. C.
Warner, S. R., Texas.

Junior

Allen, D. E., Ore.
Batey, T. E., Jr., Mass.
Ballenger, C. B., Calif.
Cooper, R. L., Ore.
Crowe, C. V., Calif.
Curtis, R. E., N. H.
Didriksen, R. G., Wash.
Dotta, D. D., Jr., Calif.
Drews, R. J., La.
Edler, A. J., Jr., N. Y.
Ellwood, R. L., Ore.
Ericksen, E., Ore.
Finch, T. L., Mont.
Goldsberry, W. M., Jr., Ark.
Goodheart, W. J., W. Va.
Griffin, W. F., Ala.
Gysel, L. W., Mich.
Hendrix, J. R., Ore.
Hunt, O. R., Ark.
Jewett, H. P., Ore.
Johnson, F. J. G., Canada.
Koenig, W. L., Mass.
Koskella, T. W., Idaho.
Lobenstein, H. L., Utah.
Lowe, J. L., N. Y.
Maki, A. T., Wash.
McComb, D. P., Ore.
Phibbs, G. O., Calif.
Rice, C. E., N. Y.
Schmidt, A. H., Mo.
Sommer, H. C., Ore.
Stein, W. I., Wash.
Usher, J. H., Ore.
Webster, J. B., Texas.
Yurchyshyn, D., Minn.

Member

Anderson, R. E., Ore.
Armstrong, F. H., Ore.
Arvola, T. F., Calif.
Avery, N. A., Wyo.
Aydelott, O. L., Ore.
Bacon, E. M., Calif.
Bacon, F. W., Calif.
Baker, Ed., Wash.
Bashore, H. W., Va.
Beals, W. F., Colo.
Beckley, W. F., Colo.
Beil, C. M., Ore.
Bennett, R., Colo.
Berry, D. W., Ore.
Bolick, E. D., Calif.
Bosworth, I. E., Calif.
Bottcher, R. P., Ore.
Bower, R. W., Calif.

Branagh, H. E., Calif.
Brown, J. P., N. C.
Burcham, L. T., Calif.
Burger, C. E., Tenn.
Burnett, G. L., Calif.
Buxton, J. S., Calif.
Case, P. C., Calif.
Charlton, J. W. H., Calif.
Chappell, C. C., Colo.
Clark, C. L., Ore.
Clark, H. S., Ore.
Clifton, O. S., S. D.
Clouser, R. W., Pa.
Croney, T. J., Ore.
Cummings, L. A., Wash.
Cummins, W. F., Ore.
Dasmann, R. E., Calif.
Davis, B. R., Miss.
Defler, S. E., Colo.
Deitz, G. L., Calif.
Dingle, R. W., Mo.
Dortignac, E. J., Colo.
Douthitt, R. H., Calif.
Dresser, W. T., Calif.
Drumheller, D. R., Va.
Drummond, J. P., Mont.
Duck, P. W., Pa.
Edmonds, M. W., Calif.
Ellstrom, R. W., Ore.
Erickson, E. S., Colo.
Evju, R., Calif.
Feiss, S. H., Ore.
Fischer, G. A., Calif.
Fix, W. L., Ind.
Folkestad, J. O., Colo.
Galbraith, A. W., Ore.
Gash, W. D., N. C.
Goodell, B. C., Colo.
Gordon, D. T., Calif.
Grant, E. A., Calif.
Grieve, W. G., Tenn.
Griffee, W. E., Ore.
Groom, J. I., Ore.
Guerrant, W. H., Va.
Hagenstein, W. D., Ore.
Hanell, O. B., Ore.
Harlan, H. F., Colo.
Harshman, L. R., Miss.
Hixon, H. J., Ore.
Hobba, R. L., La.
Hornbeck, R. L., Ore.
Hough, J. P., Ore.
House, R. W., Ind.
Hovey, A. B., Colo.
Huff, R. E., N. C.
Hughes, H. R., Colo.
Johnson, F. A., Ore.
Johnson, S. J., N. C.
Jones, R. H., Calif.
Kashin, Ted, Ore.
Kagetsu, H., Canada.
Kaiser, J. G., Calif.
Kirkmire, D. F., Ore.
Lamb, F. B., Ore.
Land, F. A., Calif.
Leavitt, R., Calif.
Manchester, E. M., N. C.
Massey, I. M., Wyo.
Matson, E. E., Ore.
McClay, T. A., N. C.
McElhinney, G. D., N. C.
McKennan, R. B., Colo.
McLeod, K., Ore.
Melichar, C., D. C.
Metz, L. J., Colo.
Meyer, W. C., Calif.
Miller, R. M., Calif.
Miller, E. E., Colo.
Minges, R. V., Colo.
Morin, R. A., N. C.
Myers, L. F., Va.
Nichols, J. M., Mo.
Nicholson, R. L., N. C.
Obye, H. C., Ore.
Otter, J. D., Calif.
Parker, L. A., D. C.
Parsons, B. E., Calif.
Patton, F. W., Va.
Patty, F. A., Calif.
Payne, B. H., D. C.
Peterson, W. A., Calif.
Pike, M. J., Ore.
Poley, W. F., Colo.
Powell, H. G., Ore.
Price, H. R., N. C.
Price, O., N. C.
Radcliffe, T. H., Ore.
Radel, J. T., Colo.
Ratliff, M. R., Colo.
Read, W. B., Ore.
Renshaw, E. W., N. C.
Reynolds, C. E., Ore.
Riley, M. M., Va.
Ripper, E. E., D. C.
Ritchie, R. W., Calif.
Roberts, A. K., Ore.
Rundgren, J. A., Colo.
Sanders, P. M., Ore.
Santopole, F. A., N. C.
Schmidley, F. X., N. C.
Schweigert, T. F., Mich.
Simpson, T. H., Calif.
Smith, A. E., Ore.
Smith, H. H., Calif.
Smith, J. W., Wyo.
Smith, L. R., Va.
Smith, N. A., Colo.
Spencer, C. C., Colo.
Spinney, W. W., Calif.
Stagelman, H. W., Colo.
Steinert, E. H., Tenn.
Stoltz, G. E., Mont.
Stone, W. E., Miss.
Stoneburner, W. H., Va.
Sundheimer, P. W., Va.
Sward, C. A., S. D.
Taber, K. A., Wyo.
Talich, P. H., Ore.
Tedrow, M., Ore.
Thornton, J. F., Calif.
Tofte, A. L., La.
Toole, E. R., N. C.
Towne, C. R., Colo.
Van Akkeren, J. J., Calif.
Vance, G. B., Calif.
Waite, D. M., Va.
Wall, M. S., Calif.
Ward, W. B., Va.
West, W. I., Ore.
Whitney, F. G., Ore.
Williams, I. A., Va.
Wirka, R. M., D. C.
Wood, R. J., Minn.
Wright, E., Colo.
Wyatt, C. G., Wyo.

Reinstated

Junior

Bingham, R. T., Wash.
Charlton, J. W., N. Y.
Fisher, J. N., Wis.
Franklin, C. R., Texas.
Hiatt, H. C., Ore.
O'Neil, W. J., Ill.

Announcement of Candidates for Membership

The following names of candidates for membership are referred to the membership for comment or protest. The list includes all nominations received since the publication of the August JOURNAL without question as to eligibilty. Names, addresses, education, and endorsements are given. The names have not been passed upon by the Council. Important information regarding the qualifications on any candidate which will enable the Council to take final action with a knowledge of essential facts should be submitted before October 15, 1949. Statements on different men should be submitted on different sheets. Communications relating to candidates are considered as strictly confidential.

Allegheny

Junior Membership

Carlaw, J. B., 16 Oakland Rd., Maplewood, N. J.; Yale, M.F., 1949. G. A. Garratt, H. J. Lutz, H. H. Chapman.

Carts, C. B., Sr. Forester, Dept. of Forests and Waters, Scranton, Pa.; Pa. State, B.S.F., 1949. V. Beede, H. H. Chisman, W. G. Edwards.

Coleman, G. B., R.D. 1, Brownsville, Pa.; Pa. State, B.S.F., 1949. V. A. Beede, H. H. Chisman, P. F. English.

Hyde, R. S., Oakwood Lane, Valley Forge, Pa.; Dartmouth, B.S., 1948; Yale, M.F. 1949. G. A. Garratt, H. J. Lutz, H. H. Chapman.

Merroth, C. S., Farm Forester, Dept. of Forests and Waters, Norristown, Pa.; Pa. State, B.S.F., 1949. H. N. Cope, H. H. Chisman, W. C. Bramble.

Rumpf, R. H., Farm Forester, Dept. of Forests and Waters, Harrisburg, Pa.; Pa. State, B.S.F., 1949. V. A. Beede, H. H. Chisman, H. S. Meyer.

Appalachian

Affiliate Membership

Bowie, P. C., Dist. Rgr., S. C. State Comm. of Forestry, Spartanburg, S. C. Appalachian.

Junior Membership

Baskervill, J. C., Jr., County Forester, N. C. Dept. of Cons., Lenoir, N. C.; N. C. State, B.S.F., 1949. C. M. Kaufman, L. Wyman, W. D. Miller.

Graff, J. N., Service Forester, Va. Forest Service, Farmville, Va.; Pa. State, B.S.F., 1949. V. A. Beede, H. H. Chisman, H. N. Cope.

Hewlett, J. D., R.F.D. No. 2, Edinburg, Va.; N. Y. State, B.S.F., 1949. J. S. Illick, R. G. Unger, L. P. Plumley.

Hicks, L. E., Dist. Forester, Div. of Forestry, N. C. Dept. of Cons., Fayetteville, N. C.; Iowa State, B.S.F., 1939. R. A. Morin, F. H. Claridge, R. D. Huff.

Kelley, W. G., 221 Trailwood, State College Station, Raleigh, N. C.; N. C. State, B.S.F., 1949. C. M. Kaufman, L. Wyman, R. J. Preston, Jr.

Marshall, J. M., Agric. Teacher, Greenwood High School, Greenwood, S. C.; Univ. of Ga., B.S.F., 1947. D. J. Weddell, A. E. Patterson, A. C. Worrell.
Smith, J. J., Jr., Forester, U.S.F.S., Murphy, N. C.; N. C. State, B.S.F., 1948. C. M. Kaufman, R. J. Preston, Jr., L. Wyman.

Central Rocky Mountain

Junior Membership

Hoffman, E. J., Range Mgmt. Asst., Pine Ridge Indian Agency, Pine Ridge, S. D.; Iowa State, B.S.F., 1947. G. B. Hartman, A. L. McComb, R. E. Getty.

Central States

Junior Membership

Barkley, R. E., 210 Rector Apt., Muncie, Ind.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.
Bylsma, J. E., 1823 N. 15th St., Lafayette, Ind.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.
Daughterty, R. G., 284 Markison Ave., Columbus, Ohio; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.
Eaton, J.W.C., Summitville, Ind.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.
Fleener, E. T., Box 107, New Palestine, Ind.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.
Goodrich, T. K., Roann, Ind.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.
Hunter, C. K., 956 Pearl St., Whiting, Ind.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.
Johns, L. A., 803 E. Grand River, E. Lansing, Mich.; Mich. State, B.S.F., 1949. P. A. Herbert, L. E. Bell, E. J. Hodgkins.
Keck, R. M., R.R. No. 5, Franklin, Ind.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.
Kirkpatrick, R. P., R.R. No. 7, Greensburg, Ind.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.
Marsicek, A. J., 4943 N. Keystone Ave., Chicago, Ill.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.
Mooney, R. L., 1818 Antoinette St., Fort Wayne, Ind.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.
Packman, R. S., 506 Napoleon St., Valparaiso, Ind.; Purdue, B.S.F., 1949. R. C. Brundage, B. N. Prentice, C. I. Miller.
Scholten, H., 8307 Howard Ave., Hammond, Ind.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.
Smith, R. E., 3804 Delaware St., Gary, Ind.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.
Stevens, I. E., 1009 E. S. Grand Ave., Springfield, Ill.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.
Whittern, L. B., R.R. No. 2, Monroeville, Ind.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.
Williams, R. D., R.R. No. 3, Bedford, Ind.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.

Columbia River

Junior Membership

Bryant, H. R., Engr. Dept., Crown Zellerbach Corp., Seaside, Ore.; Oregon State, B.S.F., 1949. P. M. Dunn, P. N. Knorr, W. F. McCulloch.
Holtsclaw, W. P., Tech. Asst. Forester, Oregon State Board of Forestry, Sisters, Ore.; Oregon State, B.S.F., 1949. H. I. Nettleton, G. H. Barnes, W. F. McCulloch.
O'Leary, J. E., Engr. Asst., Long-Bell Lbr. Co., Vaughn, Ore.; Univ. of Mich., B.S.F., 1942; Oregon State, M.F., 1947. W. K. Andreassen, R. E. Johnson, M. Bigley.

Inland Empire

Junior Membership

Bradley, John M., Jr., Proj. Supt., Bur. of Ent. & Plant Quar., Spokane, Wash. F. S. Baker, P. M. Barr, J. Kittredge.
Grimm, D. K., Woods Worker, Potlatch Forests, Inc., Lewiston, Idaho; Purdue, B.S.F., 1941. T. E. Shaw, B. N. Prentice, C. I. Miller.
Thrapp, H. W., 1204 S. Logan St., Moscow, Idaho; Univ. of Idaho, B.S.F., 1949. E. Wohletz, T. S. Buchanan, D. S. Jeffers.
Wenzel, O. G., Opportunity, Wash.; Univ. of Idaho, B.S.F., 1949. E. Wohletz, M. E. Deters, T. S. Buchanan.

Intermountain

Junior Membership

Hyder, D. H., Teaching Asst., Utah State, Logan, Utah; Univ. of Idaho, B.S.(Forestry), 1947; Utah State, M.S., 1949. L. A. Stoddart, L. W. Turner, A. D. Smith.
Mattox, J. E., Range Mgmt. Asst., U. S. Bur. of Land Mgmt., Salmon, Idaho; Univ. of Idaho, B.S.F., 1947. D. S. Jeffers, M. E. Deters, E. Wohletz.

Kentucky-Tennessee

Junior Membership

Gilbert, J. A., Plant Supt., American Creosoting Co., Louisville, Ky., Univ. of Mich., B.S.F., 1939. J. C. Burwell, J. H. Bucher, Jr., R. B. Gierow.
Mitchell, A. L., Millington, Tenn.; Purdue, B.S.B., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.

New England

Junior Membership

Adams, R. T., 6 Cedar St., Orono, Me.; Univ. of Me., B.S.F., 1949. F. K. Beyer, R. I. Ashman, G. Baker.
Anderson, R. E., 25 Maple St., Merrimac, Mass.; Iowa State, B.S.F., 1949. G. B. MacDonald, G. B. Hartman, L. F. Kellogg.
Chitty, M. L., Agric. Aide, N. E. Forest Exp. Sta., Bangor, Me.; Univ. of Me., B.S.F., 1949. G. Baker, F. K. Beyer, R. I. Ashman.
Damon, H. S., 242 Whitney Ave., New Haven, Conn.; Amherst, B.A., 1940; Yale, M.F., 1949. G. A. Garratt, H. J. Lutz, H. H. Chapman.
Jarmolovich, V. J., Forestry Crew, City of Hartford, Hartford, Conn.; N. Y. State, B.S.F., 1949. J. S. Illick, R. G. Unger, L. P. Plumley.
Lynch, T. F., 100 Hayes Ave., Lowell, Mass.; Yale, B.S., (Botany), M.F., 1949. G. A. Garratt, H. J. Lutz, H. H. Chapman.
Neff, A. W., 47 Hillcrest, Orange, Conn.; Univ. of N. H., B.S.F., 1948; Yale, M.F., 1949. G. A. Garratt, H. J. Lutz, H. H. Chapman.
Whipple, P. C., 79 Larchwood Drive, Cambridge. Mass.; Harvard, B.S., 1944; Yale, M.F., 1949. G. A. Garratt, H. J. Lutz, H. H. Chapman.
Winer, H. I., Petersham, Mass.; Yale, B.A., (Botany), 1947; M.F., 1949. G. A. Garratt, H. J. Lutz, H. H. Chapman.
Wright, J. P., Howard Drive, Bergenfield, N. J.; Swarthmore College, B.A., 1947; Yale, M.F., 1949. G. A. Garratt, H. J. Lutz, H. H. Chapman.

New York

Junior Membership

Armstrong, G. R., Agric. Ext. Office, City Courthouse, Binghampton, N. Y.; N. Y. State, B.S.F., 1949. M. J. Ferree, H. L. Shirley, L. P. Plumley.
BaRoss, R. P., Box 573, Broadway, Greenlaw, L. I.,

N. Y.; Purdue, B.S.F., 1949. T. E. Shaw, B. N. Prentice, C. I. Miller.

Castor, G. D., Instructor, N. Y. State College of Forestry, Cranberry Lake, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, L. P. Plumley, R. G. Unger.

Clute, V. C., Field Scout Exec., Boy Scouts of America, Glens Falls, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, L. P. Plumley, R. G. Unger.

Colville, W., Jr., 1088 Anderson Ave., Bronx, N. Y.; Univ. of Pa., B.S., (Econ.), 1936; Yale, M.F., 1949. G. A. Garratt, H. J. Lutz, H. H. Chapman.

Johnson, F. L., 1310 Morris Ave., New York, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, R. G. Unger, L. P. Plumley.

Lee, G. E., Soil Cons., U.S.D.A., Oneonta, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, R. G. Unger, L. P. Plumley.

McArthur, D. M., Soil Cons., S.C.S., Warsaw, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, R. G. Unger, L. P. Plumley.

Meylan, G. J., Dist. Rgr., N. Y. Cons. Dept., Cortland, N. Y. New York.

Owens, J. M., Asst. Prof. of Forest Ext., N. Y. State College of Forestry, Syracuse, N. Y.; N. Y. State, B.S.F., 1938. J. S. Illick, R. G. Unger, L. P. Plumley.

Penney, R. A., 112 Hartley St., Syracuse, N. Y.; N. Y. State, B.S.F., 1949. J. S. Illick, R. G. Unger, L. P. Plumley.

Wallace, R. J., Silvic. Dept., N. Y. State College of Forestry, Syracuse, N. Y.; Univ. of N. H., B.S., (Forestry), 1947; N. Y. State, M.F., 1949. J. W. Barrett, S. O. Heiberg, H. J. Farrell.

Northern California

Affiliate Membership

Fletcher, O. J., Constract Tbr. Falling Crew, Stockton Box Co., West Point, Calif. Northern California.

Riley, J. D., Land & Timber Office, Union Lumber Co., Fort Bragg, Calif. Northern California.

Junior Membership

Baronovich, F. J., Teaching Asst., Univ. of Calif., Berkeley, Calif.; Univ. of Calif., B.S.F., 1949. F. S. Baker, J. Kittredge, E. Fritz.

Belforte, C. R., 1265 N. School St., Stockton, Calif.; Univ. of Calif., B.S.F., 1949. F. S. Baker, E. Fritz, A. W. Sampson.

Black, B. W., U. S. Park Rgr., Sequoia Natl. Park, Calif.; Univ. of Calif., B.S.F., 1948. F. S. Baker, E. Fritz, J. Kittredge.

Davidson, H., Tbr. Cruising, Hammond, Jenson and Wallen, Oakland, Calif.; Univ. of Calif., B.S.F., 1949. E. Fritz, F. S. Baker, R. A. Cockrell.

Fenner, R. L., Assoc. State Forest Rgr., State Div. of Forestry, North Sacramento, Calif.; Univ. of Calif., B.S.F., 1948. F. M. Dunow, H. P. Meyer, W. C. Finster.

Gilbert, R. R., Forestry Aide, Calif. Forest & Range Exp. Sta., Berkeley, Calif.; Univ. of Calif., B.S.F., 1949. S. N. Wyckoff, H. A. Fowells, R. A. Dellberg.

Navon, D. R., Proj. Foreman, U.S.F.S., Susanville, Calif.; Univ. of Calif., B.S.F., 1949. F. S. Baker, W. Mulford, D. F. Roy.

Pedlar, J. E., Fire Fighter, Div. of Forestry, State of Calif., San Andreas, Calif.; Univ. of Calif., B.S.F., 1949. R. N. Colwell, F. S. Baker, R. A. Cockrell.

Reifsnyder, W. E., Sr. Lab. Asst., Univ. of Calif., Berkeley, Calif.; N. Y. Univ., B.S., 1944; Univ. of Calif., M.F., 1949. F. S. Baker, E. Fritz, A. W. Sampson.

Sacher, J. A., Forester, Wetsel-Oviatt Lbr. Co., Omo Ranch, Calif.; N. Y. State, B.S.F., 1941. J. S. Berry, A. W. Herbert, R. Hall.

Starti, C. E., Forester and Asst. Mgr., Scott Lbr. Co., Burney, Calif. Northern California (Aff. Member, 1946).

Ozark

Junior Membership

Collins, P. E., Ext. Forester, Kansas State College, Manhattan, Kansas; Univ. of Minn., B.S.F., 1948; M.S., 1949. D. P. Duncan, L. W. Rees, F. H. Kaufert.

Patton, A. C., Box 319, Dermott, Ark.; Arkansas A. & M., B.S., 1947; Yale, M.F., 1949. G. A. Garratt, H. J. Lutz, H. H. Chapman.

Puget Sound

Junior Membership

Storms, M. W., 1105 Roosevelt Ave., Yakima, Wash.; Univ. of Wash., B.S.F., 1949. J. C. H. Robertson, P. G. Haddock, O. H. Schrader, Jr.

Southeastern

Junior Membership

Buck, R. J., Lbr. Salesman, Tidewater Lbr. & Supply Co., Miami, Fla.; Univ. of Me., B.S.F., 1949. R. I. Ashman, R. K. Beyer, G. Baker.

Bumgarner, H. D., Asst. Forester, Natl. Turpentine & Pulpwood Corp., Lake Butler, Fla.; Univ. of Fla., B.S.F., 1949. P. W. Frazer, W. D. Brush, J. E. Dickinson.

Gaffney, M. T., Polk City, Fla.; Univ. of Fla., B.S.F., 1949. H. S. Newins, K. R. Swinford, W. D. Brush.

Haigh, W. S., 1612 Stockton St., Jacksonville, Fla.; Pa. State, B.S.F., 1937; Duke, M.F., 1949. Reinstatement.

McCullough, J. M., Proj. Forester, Ala. Dept. of Cons., Ozark, Ala.; La. State, B.S.F., 1949. M. J. Steensland, R. L. Snyder, J. M. Stauffer.

O'Barr, M. M., Asst. Dist. Forester, Ga. Forestry Comm., Atlanta, Ga.; Univ. of Ga., B.S.F., 1947. D. J. Weddell, A. E. Patterson, A. C. Worrell.

Perryman, J. D., Forester, Hudson Pulp and Paper Corp., Palatka, Fla.; Univ. of Fla., B.S.F., 1948. H. S. Newins, P. W. Frazer, K. R. Swinford.

Riley, J. C., Asst. to Forester, Alger-Sullivan Lbr. Co., Century, Fla.; Univ. of Mich., B.S.F., 1942. T. W. Belchrad, Sam Guttenberg, S. E. Bond.

Turner, C. L., Asst. Dist. Forester, St. Joe Paper Co., Port St. Joe. Fla.; Univ. of Fla., B.S.F., 1949. P. W. Frazer, H. S. Newins, E. A. Ziegler.

Southern California

Junior Membership

Dodge, J. M., Fire Prevention Patrolman, U.S.F.S., Angeles, Natl. Forest, Calif.; Univ. of Calif., B.S.F., 1949. F. S. Baker, R. A. Cockrell, H. H. Biswell.

Southwestern

Junior Membership

Fordyce, D. H., 402, N. Humphrey St., Flagstaff, Ariz.; Colo. A. & M., B.S.F., 1947; Yale, M.F., 1949. G. A. Garratt, H. J. Lutz, H. H. Chapman.

Stricklin, H. B., Chief Park Rgr., Grand Canyon Natl. Park, Ariz.; Black Hills Teachers College, B.S., (Education), 1929. Southwestern.

Upper Mississippi Valley

Junior Membership

Brown, K. D., Training Program, Long-Bell Lbr. Co, Ames, Iowa; Iowa State, B.S.F., 1949. G. B. Hartman, A. F. McComb, R. E. Getty.

Zaidlicz, E., Friley Hall, Iowa State, Ames, Iowa; Iowa State, B.S.F., 1949. G. B. Hartman, A. L. McComb, R. E. Getty.

Wisconsin-Upper Michigan

Junior Membership

Bushman, R. R., 1107 W. 5th Street, Appleton, Wis.; Mich. State, B.S.F., 1949. P. A. Herbert, P. W. Robbins, E. J. Hodgkins.

Lupa, A. J., 1010 Steuben St., Wausau, Wis.; Dartmouth College, A.B., 1947; Yale, M.F., 1949. G. A. Garratt, H. J. Lutz, H. H. Chapman.

Upton, N. W., Forester, Wisconsin Realty Co., Milwaukee, Wis.; Univ. of Minn., B.S.F., 1924. F. G. Wilson. R. W. Abbott, H. C. Jacobs.

Member Grade

Fisher, J. N., Griffith State Nursery, Wisconsin Rapids, Wis.; Univ. of Minn., B.S.F., 1937. Wisconsin-Upper Michigan (Jr. member, 1937R49).

Foreign

Corresponding Member

Tajeda, R. P., Intern., Pan-American Intern. Program, U.S.D.A. Albuquerque, New Mexico; National Agriculture School, 1944. Committee on International Relations.

The following have been Junior members for at least 6 years and are eligible for automatic advancement to Member grade. The Sections have certified them as actively engaged in forestry work and competent to represent the profession honorably and capably in the performance of their duties.

Central States

Weber, Louis S., 307 N. Michigan Ave., Chicago, Ill.
Wycoff, Hugh, State Tree Nursery, Topeka, Ill.

Columbia River

Rouse, C. H., Fish & Wildlife Service, Lakeview, Ore.

Inland Empire

Marks, Elmer R., U.S.F.S., Clarkia, Idaho.
Pierce, W. R., U.S.F.S., Orofino, Idaho.
Smith, Edward W., 3rd., U.S.F.S., St. Maries, Idaho.
Welton, W. H., U.S.F.S., Avery, Idaho.

New England

Bunnell, R. G., Eastford, Conn.
Codman, W. S., Littleton, N. H.
Hodgkins, P. M., Concord, N. H.
Olson, A. R., Conn. Agric. Exp. Sta., New Haven, Conn.
Park, R. B., Jr., Private Forester, North Stonington, Conn.
Smalley, F. E., Manchester Center, N. H.
Springer, J. B., Box 42, Buckingham, P. Q., Canada.
Stephens, T. K., St. Lawrence Paper Mills Co., Quebec, Canada.
Turner, Frederick, J., County Forester, Brattleboro, Vt.
Wilkinson, James E., Jr., Chelsea, Vt.

Southeastern

Blocker, Nelson B., 335 Fourth Street, Atlantic Beach, Fla.
Butz, J. A., Florida Forest Service, Tallahassee, Fla.
Clark, Floyd F., Jr., Con. Forester, Ocala, Fla.
Cranston, William V., U.S.F.S., Haleyville, Ala.
Mather, D. W., U.S.F.S., Ocala, Fla.
Mignery, A. L., Southern Forest Exp. Sta., Brewton, Ala.
Nagle, W. B., Southern Chemical & Resin Co., Glen St. Mary, Fla.
Owens, James W., Jr., Gulf States Paper Corp., Tuscaloosa, Ala.
Roller, H. M., Jr., Int. Paper Co., Woodlands Div., Panama City, Fla.
Spratt, J. R., Atlanta Land & Improvement Co., LaBelle, Fla.
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Stewart, Alban, Stewart Nursery, Tallahassee, Fla.
Weaver, Lewis J., 303 South Broadway Ave., Sylacauga, Ala.
Williams, George B., Turpentine & Rosin Factors, Inc., Valdosta, Ga.
Williams, Henry E., Camden Protection Unit, Woodbine, Ga.

Upper Mississippi Valley

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Forder, M. H., U.S.F.S., North Home, Minn.
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Sanders, Roy D., Brainard, Minn.
Settergrew, R. G., U.S.F.S., Cass Lake, Minn.

Wisconsin-Upper Michigan

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Kulp, J. W., Forest Products Lab., Madison, Wis.
Patton, R. F., Dept. of Plant Pathology, Univ. of Wisconsin, Madison, Wis.
Trust, Jack, State Ranger Sta., Spooner, Wis.

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Forestry News

Compiled by ROBERT D. HOSTETTER, *Assistant Executive Secretary*

UNSCCUR Discusses Resources At Lake Success Conference

Eminent scientists from all over the world are participating in the United Nations Scientific Conference on the Conservation and Utilization of Resources, in session from August 17 to September 6 at Lake Success, N. Y.

This is the first such world meeting of its kind in that its participants represent numerous sciences related to a single problem instead of representing their respective governments. The conference has no policy-making function. Its primary concern is the practical application of science to resource management and human use, rather than with minute refinements in research and scientific methodology.

In addition to plenary sessions dealing with the overall problems of world resources, sixty section meetings are being conducted that have specific bearing on water, land, forests, fuels and energy, and minerals.

Forestry problems being considered include those which are concerned with forest management, protection, administration, harvesting, manufacturing, wood chemistry, wildlife, influences, basin development, and grasslands.

The ultimate aim of the conference is the enrichment of human life. This conference is the first step toward the world mobilization of resource techniques and know-how, one of the essentials in bringing this enrichment to reality.

Sixty-five nations were invited to select technicians to present papers at the conference.

Big Game Problems Discussed

Subjects considered by the International Technical Conference on the Protection of Nature at its meeting, from August 22 to September 1 at Lake Success, N. Y., included the effects of "planned enterprises" on the balance of nature; the problem of vanishing big game in Asia and Africa; emergency action for preserving vanishing species of flora and fauna, and problems connected with frontier parks.

The meeting was sponsored by the United Nations Educational, Scientific, and Cultural Organization.

Extension Forester Appointed

Paul E. Collins has been appointed extension farm forester in Kansas.

He graduated from the University of Minnesota in 1948 and received his MF there this year.

He served in the Air Force from 1941 to 1946.

Bank Purchases Tree Planter To Improve County's Economy

M. E. Cooper, president of the Bank of Wiggins, Wiggins, Miss., has announced the purchase of a tree-planting machine for Stone County farmers.

The planter is one which was developed and perfected by the Illinois Central Railroad, based on the Purdue University Planter developed by Daniel Den Uyl.

Otho C. Rowell, Stone County Agricultural Agent, will supervise the use of the machine which has been demonstrated before farmers, businessmen and others in the county.

"The bank purchased the planter with no strings attached," says John Guthrie, Illinois Central's forestry agent, "with the sole idea of improving the economic status of the community which it serves, and thus the economic status of all business."

Tomcat's Hunting Ability Noted

"Mr. Butter," a tomcat owned by Dr. G. W. Bradt, former head of Michigan Conservation Department's Rose Lake Experiment Station, tallied the following kill during an 18-month period: 1,600 mice, 54 English sparrows, 15 shrews, six barn rats, four young rabbits, three gophers, two gold-finches, two chipping sparrows, one flicker, one meadowlark, one robin, and one white-throated sparrow.

In the interest of scientific wildlife management, Dr. Bradt praised the cat for each kill in order to eliminate bias in making an accurate estimate of what a normal, uninhibited farm cat would prey on. "Mr. Butter" left and entered the house at will through a special swinging door and always announced his return with game by meowing loudly.

Chamber of Commerce Group Studies Federal Regulation

Reappointment of D. A. Hulcy, president of the Lone Star Gas Company, Dallas, as chairman of the Natural Resources Committee of the Chamber of Commerce of the United States was announced on July 13.

This committee concerns itself with the common interests of natural resources industries—those dealing with fuels, metals, minerals, water, hydropower, forestry, grazing and public lands. The committee is responsible for effectuating and keeping up-to-date the National Chamber's policy declarations with reference to this field, so that they reflect as nearly as possible current interests and needs.

Major interests to be considered include regional authorities and public power policy, reorganization of federal natural resources agencies under the Hoover Commission proposals, tidelands and other oil and natural gas bills, and proposals for federal regulation of forestry practices.

S.A.F. members on the committee include Nelson C. Brown, Bertram E. Claridge, Julian F. McGowin, W. S. Rosecrans, and O. T. Swan.

Spirits Kill Nursery Weeds

Time-and-cost studies run by E. F. Biebesheimer, superintendent of the Hugo Sauer Nursery in Wisconsin, reports a saving of 53 to 76 percent in the use of mineral spirits as compared with hand weeding. Costs where no subsequent hand weeding was required were $17.87 per acre as compared with usual hand weeding costs of $75.87 per acre.

From 25 to 90 gallons of mineral spirits per acre, depending on age and species of seedlings, are recommended by J. H. Stoeckler in "Control of Weeds in Conifer Nurseries by Mineral Spirits," Station Paper No. 17 of the Lake States Forest Experiment Station.

Pulpwood Length Debated

"Four-Foot vs. Longer Length Pulpwood" will be the topic discussed by a technical committee of the American Pulpwood Association at a meeting in Gorham, N. H. on September 27 and 28.

Forest Industries Organize Regional Radio Committees

Recent establishment of regional groups within National Forest Industries Communications made private forestry companies eligible for permanent classification by the Federal Communications Commission in the Forest Products Radio Service category.

Chairmen of the four regional groups are: Western Region, Robert Olin, Patlatch Forests, Inc., Lewiston, Ida.; Southern Region, A. M. Dantzler, The L. N. Dantzler Lumber Company, Perkinston, Miss.; Lake States Region, R. L. Wasley, M & O Paper Company, Minneapolis, Minn.; and Eastern Region, William S. Bromley, American Pulpwood Association, 220 East 42nd Street, New York, N. Y.

Communications relating to licenses in any particular region should be addressed to the chairman of that region.

A national frequency committee, composed of the chairmen of the regional frequency committees has also been organized. Its members are Gerald Schafer, chairman, Schafer Brothers Logging Co., Aberdeen, Wash.; Arthur W. Nelson, Jr., Flintkote Company, Meridian, Miss.; Robert Dosen, Nekoosa Paper Company, Port Edwards, Wis.; and William S. Bromley, American Pulpwood Association, 220 East 42nd Street, New York, N. Y.

Included in the Western Region are Washington, Oregon, California, Idaho, Montana, Nevada, Utah, Arizona, New Mexico, Colorado, and Wyoming. States in the Southern Region are Oklahoma, Texas, Arkansas, Louisiana, Mississippi, Alabama, Tennessee, Kentucky, Virginia, North Carolina, South Carolina, Georgia, and Florida. The Lake States Region extends from Ohio to Kansas and north to Canada. The 12 northeastern states are in the Eastern Region.

Chairman of the national executive committee is Robert W. Olin, and Elmer L. Surdam is secretary.

Financial contributions toward the operation of National Forest Industries Communications, which was able to secure equitable recognition on a national basis by the F.C.C., were made by 65 western operators.

W. Gard Conklin Retires

W. Gard Conklin, director of the Administrative Bureau of the Pennsylvania Game Commission, Harrisburg, retired August 1 after 41 years of service to the commonwealth.

W. GARD CONKLIN

A 1908 graduate of Pennsylvania State Forest Academy at Mont Alto, he served as forester in the State Department of Forestry from 1908 to 1920, then transferred to the State Game Commission. For many years he was in charge of title examination and acquisition of state game lands.

Emulsion Increases Survival

Dipping ponderosa pine seedlings in a solution of Ceremul C prior to planting increased the survival of the trees from 10 to 20 percent, as indicated by experiments conducted under the direction of R. M. Kallander who is in charge of the planting research projects in Oregon.

Ceremul C is a wax emulsion used to reduce transpiration. It proved most effective when one part Ceremul C was used to eight parts of water.

On lands of the Kinzua Pine Mills in Wheeler County, survival of Ceremul C-dipped trees was 87 per cent compared with 64 percent survival of untreated trees. On pumice soil south of Bend on lands owned by the Gilchrist Timber Company, survival of treated trees was 79 percent as compared with 61 percent for untreated trees.

Survival in the Klamath areas was 50 percent for treated trees and 40 percent for untreated trees.

North Carolina State College Schedules Photo Short Course

A short course in aerial photo interpretation in forestry will be held at N. C. State College September 12-16, according to Dr. Richard J. Preston, Jr., director of the College's Division of Forestry.

Earl J. Rogers of the Northeastern Forest Experiment Station will be in charge of the course. He has conducted courses of this type for the U. S. Forest Service and is one of the pioneers in applying aerial photography to forestry.

Subjects included in the course will be use of the stereoscope and multiscope, type identification, estimating heights by shadows and by parallax, estimating crown diameters and tree density, and estimating forest area.

Goodyear Heads Forest Project

T. S. Goodyear, former supervisor of forestry in the state of Washington, on July 25 became supervisor of Sustained Yield Forest Project No. 1. His appointment was announced by a committee set up by the state legislature to survey the sustained yield forest on the Olympic Peninsula.

The committee acted on the recommendation of a special group of forestry experts including Gordon D. Marckworth, dean of the School of Forestry of the Universtiy of Washington; Paul Atkinson, president of the Olympic Logging Association; and H. J. Andrews, regional forester at Portland.

Nursery Acidity Corrected

Use of from 500 to 1,500 pounds of ground limestone per acre has been effective in correcting excessive acidity of conifer nurseries in Wisconsin, according to J. H. Stoeckeler of the Lake States Forest Experiment Station.

Excessive acidity, which results in a yellowing of needles when the pH is around 4.0 to 4.3, is caused by the application of sulphuric acid to prevent damping off and by the use of peat to supply organic matter needed in the sandy nursery soils.

Limestone is applied when the seedlings are about ten weeks old, after damping off danger is past.

Forestry Legislation

Forest

S. J. Res. 24 to provide for a suitable and adequate system of timber access roads to and in the forests of the U. S. was reported favorably to the Senate by the Committee on Agriculture and Forestry on July 1.

H. R. 2296, to increase appropriations for the administration of the Clark-McNary act and for other purposes was reproted with amendments to the floor of the Senae on July 5. On July 26 it was objected to, but will come up for consideration again.

As the bill was presented to the Senate, the provision for technical services to private owners of forest land (new Section 10) had been deleted.

Recreation

H. R. 892 to authorize the establishment of a Federal Inter-agency Committee on Recreation passed the House on July 18.

H. R. 3440 to add certain lands to Rocky Mountain National Park was reported to the Senate on July 25.

Wildlife

H. R. 5187 to protect consumers and others against misbranding, false advertising, and false invoicing of fur products and furs passed the House on July 14.

S. 1070, the federal housing act became Public Law 171 on July 15. Provisions not included in the act as passed were the subjects of legislative action during the remainder of the month.

Development

S. 2229 (by Johnson of Colorado) supersedes earlier bill, S. 533, and provides for the settlement of certain parts of Alaska by veterans, excluding areas needed for present or future public use. Referred to Committee on Interior and Insular Affairs on July 11.

H. R. 940, authorizing the Eklutna hydroelectric plant and continuing investigations on natural resources development in Alaska passed the House on July 13.

Orr Transfers to Ogden

Leslie W. Orr, formerly located at the Agricultural Research Center, Beltsville, Md., has been transferred to Ogden, Utah where he will be in charge of forest insect surveys and technical assistance on control work in the Intermountain states.

States Locate Seed Sources

Obtaining sufficient tree seed to supply State-operated forest nurseries is a major concern of forest management chiefs this fall. Unprecedented demands for seedlings by forest industries and farmers have resulted in the establishment of seedling production goals higher than ever before.

Finding that commercial seed sources do not adequately meet their needs, instructions have been issued to state field personnel to locate potential seed sources, giving particular attention to desirable characteristics in the parent trees, so that cones can be collected at the proper time.

R. A. Bonninghausen, forest management chief of the Florida Forest Service said, "Every available pound of seed will be put in the nurseries to try to reach the goal of 25,000,000 seedlings."

Olympics Add Orienteering

Ski orienteering will be a new sport added to the 1952 Olympic winter program in Oslo, Norway.

Since the introduction of orienteering in Sweden 30 years ago, and its more recent winter variety—ski orienteering, the vigorous, outdoor sport has become one of the most popular in Scandinavia.

Orienteering includes the art of finding one's way quickly and safely through unknown country without other aids than a map and compass. Courses traversed are usually 6-12 miles in distance, while ski orienteering courses may be twice that.

The sport was introduced into America in 1946 by Bjorn Kjellstrom. "The Sport of Orienteering," a book on the subject, is obtainable from Silva, Inc., First National Building, La Porte, Ind.

New Park Board Established

All state forestry activities in Florida are now supervised and directed by the Florida Board of Forestry, while a Board of Parks and Historic Memorials will handle matters pertinent to its interests.

Both boards were established on July 1, resulting from the division of the former Board of Forestry and Parks.

Helsinki Congress Recommends Forestry Principles Statement

The Third World Forestry Congress, which met in Helsinki, Finland, from July 10 to 20 ended on a note of enthusiastic international cooperation on the part of all delegations present at the meeting.

The Congress, called at the suggestion of the Food and Agriculture Organization of the United Nations, has been meeting in Helsinki at the invitation of the Government of Finland.

The Congress unanimously adopted a report containing technical suggestions and including general recommendations affirming the belief that each country should have a sound forest policy involving legislation, research, education, and professional training. The report also recommended that FAO prepare a statement on basic principles of sound forestry for the consideration of member nations and that the FAO Annual Conference, meeting in Washington, D. C., in November of this year, explore what further steps are needed for this implementation. Unanimous approval included that of the delegations from Russia, Sweden, and Argentina, countries who are not members of FAO.

The Congress was regarded as a great success by those in attendance. The work was carried out by delegates representing almost 90 percent of the world's forest area.

The Argentine Government has offered to act as host for the Fourth World Forestry Congress, to be sponsored by FAO.

Previous World Forestry Congresses were held in Rome in 1926 and in Budapest in 1936.

D. Roy Cameron, FAO forestry officer in Geneva, representing Secretary-General of the United Nations Trygve Lie, said during an address to the Congress that he believed the meeting would make a real contribution to the improvement of the ways of life of peoples in all parts of the world. "That improvement will come from two sources," he said, "the first will be heightened interest in forestry which should prompt governments to re-examine their forest policies and administrative measures; the second will be the broadening of technical knowledge and diffusion of new ideas."

Dr. Eino Saari of Finland served as chairman of the Congress.

Cooperative Game-Forestry Management Program Started

A forest-game management program correlated with the U. S. Forest Service timber management program has been started by the North Carolina Wildlife Resources Board on the National Game Preserve of the Pisgah National Forest.

Under present plans approximately ten per cent of an area of 60,000 acres will be clear-cut every ten years on a 100-year rotation. Cuttings will be made in blocks up to 100 acres in size, well dispersed through the management area. To insure forest reproduction, seed trees will be preserved and forest products will be sold on the stump for saw logs, cordwood, pulp, and chemical, and acid woods. The Forest Service, with Knutsen-Vandenberg funds, will improve the clear-cut areas for forest regeneration. Using Pittman-Robertson funds, the Wildlife Resources Board will then treat the cutting area further for game production, particularly turkeys and deer.

Most of the cost of game management will be derived directly from the sale of timber and forest products, and a maximum amount of each type of food and cover for forest wildlife, consistent with good forestry, will be produced.

A similar cooperative system of game and forest management has been in operation for ten years on the national forests of Virginia and has proved of value both to the forester and to the wildlife technician and sportsman.

Private, Federal Jobs Equal

Of Oregon State College's 84 recent forestry graduates, 31 are working for federal agencies, 10 with the state of Oregon, 31 with industry, and 11 on miscellaneous forestry jobs.

Forestry management was the major of 56 of the men; 16 were in forest products; and 12 in forest engineering.

Average age of the graduates is 26-1/2 years, 95 percent are war veterans, and over half are married.

SHADA Manages Haitian Pine

Societe Haitiano-Americaine de Developpment Agricole is currently engaged in the management of timber on a concession of 110,000 acres in Haiti as one of several projects, according to James P. Johnston, manager of the forest division.

Except for occasional stands of non-commercial hardwoods, the forested area within the concession is a pure stand of Haitian pine (*Pinus occidentalis*), a highly resinous, hard

JAMES P. JOHNSTON

pine. An annual cut of about 4,000,000 board feet is currently harvested under the tree selection method to remove over-mature and deformed trees and to thin dense stands.

Fire protection is of primary importance in SHADA's forestry program because fires used by Haitian farmers to clear their crop lands frequently escape to timberland areas.

Mean elevation of the forest is 5,500 feet. Experiments in raising high-altitude coffees, which because of their mildness bring high prices, are also being conducted.

Mr. Johnston received the BSF degree from the University of Washington in 1942 and in 1947 was awarded the MF degree. He was formerly employed by the J. Neils Lumber Company, Glenwood, Wash. and went to Haiti in January, 1948.

He is assisted by Arthur H. Pedersen, a 1943 University of Washington graduate.

Production of sisal is another major project of SHADA.

Manufacture Back Pack Guns

A new, larger type of paint gun is being distributed by the Pet Timber Marking Company, 1105 Carola Avenue, Columbia, S. C.

A one-gallon tank is carried on the back. A hose leads to a hand nozzle from the tank.

F. A. O. Assigns M. A. Huberman To Forestry Post in Bankok

Dr. M. A. Huberman, technical officer in the forestry branch, Forestry and Forest Products Division, Food and Agriculture Organization of the United Nations, left on July 1 for Bangkok, Thailand, headquarters of the FAO regional office for Asia and the Far East, where he will act as chief of forestry and forest products.

This post will be of great importance in that region in putting into effect recommendations of the Forestry and Timber Utilization Conference for Asia and the Pacific held by FAO in Mysore, India, March 28 to April 8, 1949. The importance of forestry has been emphasized by FAO as a prime factor in the raising of living standards throughout the world, one of the fundamental aims of FAO. The Mysore Conference was the first meeting of representatives of the countries of the Far East to discuss common problems of forestry and timber utilization. Dr. Huberman acted as Secretary-General of the conference.

Among the working group's functions will be to arrange for exchange of technical and professional information between countries; to arrange for a meeting of technical experts to discuss the standardization of grades and sizes of timber and plywood, nomenclature and trade terms; and to arrange for an exchange of specialists, technicians, and students between countries.

As preparation for his new post and for his office as Secretary-General of the Mysore Conference, Dr. Huberman traveled through almost all of the countries of South East Asia, discussing forestry problems with those officials who are concerned with forest management, trade, soil conservation practices, etc. He served also with General Douglas MacArthur's headquarters in Japan as a member of the Forestry Division of the Natural Resources Section. In 1947 he did exploratory travel in Latin America in preparation for the FAO conference on forestry and forest products in Teresopolis, Brazil.

A United States citizen, Dr. Huberman joined the staff of FAO in October 1946. He is a graduate of Michigan State College and holds a master's degree in forestry and a Ph.D. from Yale University.

Sawdust-Burning Furnace Used for Curing Tobacco

For the first time in the 100-year history of curing bright-leaf tobacco, sawdust has been used as the fuel to make the cure. This was done in an automatic furnace that required only setting the thermostat and filling the hopper with sawdust several times a day.

The furnace, installed by the Southeastern Forest Experiment Station and Forest Products Laboratory in a cooperative study with the McNair Investment Company, Inc., Laurinburg, N. C., is a standard type sawdust burner with a large hopper feeding sawdust by gravity to the fire on sloping metal grates inside a metal firebox. Temperature is controlled by a thermostat inside the tobacco barn. Much of the combustion takes place in a secondary combustion chamber built of masonry inside the tobacco barn. The flue system in the barn is conventional.

Walton R. Smith reports that six cures of tobacco, each lasting 5 to 6 days, were made during the 1948 season, using a total of 11 tons of sawdust, or about 3,800 pounds per cure. Throughout the tobacco belt much sawdust, now unused and rotting, could be utilized to cure tobacco conveniently and at a lower cost.

Morbeck Retires From Lab

George C. Morbeck, for 27 years employed at Madison, Wis. doing forest products research, recently retired from the U. S. Forest Service.

He held a professorship in forestry at Iowa State College for ten years before going to Madison. One of his students at Iowa State was Lyle F. Watts, now Chief of the U. S. Forest Service.

Morbeck was graduated from Michigan State College and worked two years for the Forest Service in New Mexico before joining the faculty at Iowa State College.

Potlatch Plans Pulp Plant

Potlatch Forests, Inc., Lewiston, Ida. is planning the construction of a wood pulp mill which will initially produce 230 tons a day. Employing about 300 people when in operation, the cost of the mill being considered would be over 12 million dollars.

Wildlife Cover Plots Planted

Over 200 demonstration plots averaging eight acres in size have been established in Rock County, Wisconsin to provide desirable cover for wildlife. Fencing materials are furnished by the Wisconsin Conservation Department which leases the land from the farmers for one dollar per acre per year.

At the end of five years, over a million trees and shrubs will have been planted on the wildlife management plots in the project which centers in Rock County.

A considerable amount of the planting is being done by youngsters who are learning that wildlife cover must be improved to produce more wildlife.

The use of weed-killing chemicals on fence rows has eliminated much desirable wildlife cover.

Public Education Stressed

P. A. Bloomer, president of the Louisiana Forestry Association, member of the Louisiana Forestry Commission, and a past-president of the Southern Pine Association was the principal speaker at a district "Keep Louisiana Green" meeting held at Oberlin, La. on August 3.

The meeting, sponsored by the Louisiana Forestry Association as part of its state-wide plan of public education in forest fire prevention, also featured a tour of Oberlin State Nursery and a field demonstration of the Louisiana Forestry Commission's radio-equipped fire fighting apparatus.

John B. Ferran is the executive secretary of the Louisiana Forestry Association.

Service Sets Safety Record

In spite of the hazardous nature of much of the work involved, the U. S. Forest Service completed on July 10 a full year without a fatal accident, the first fatality-free year on record.

Two deaths were reported the previous year and 12 was the average for the ten years preceding.

In commending the Forest Service on its record, Secretary of Agriculture Charles F. Brannan emphasized the occupational risks of fire fighting, construction and maintenance, and the contributing factor of unskilled seasonal labor.

Fir Used for Apple Boxes

Use of fir and lodgepole pine to supplement ponderosa pine in the manufacture of apple boxes is increasing forest utilization in north central Washington.

Approximately 20,000 cars of apples will be shipped from the Wenatchee-Okanogan district this year, and 30 to 35 percent of the apple shook produced will be from fir or other mixed species, according to V. V. Heiling of Pine Box Sales.

In 1947 the Wooden Box Institute conducted research which showed that fir is entirely acceptable for use in packing, storage, and shipping.

Forester Aids Woods Owners

Edward H. Canter, a 1949 University of Missouri graduate, has been appointed an assistant county agent in the southeastern district of Missouri.

He will assist woodland owners in securing better protection, production, and utilization of forest crops.

TREES FOR SALE
Forest Planting & Christmas Trees
Norway Spruce, Red Pine, White Pine, Scotch Pine, White Spruce, Colorado Blue Spruce, etc. Prices are reasonable and the trees are GUARANTEED TO LIVE.
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Red Tape Hampers Owners Of New England Timberland

According to the *Monthly Review* of the Federal Reserve Bank of Boston, "All of the New England states have legal provisions for special classification of forest land or reforested areas for property-tax purposes under prescribed conditions. These laws provide for the exemption of young growing timber, or for an arrangement under which no annual tax is levied on standing timber but a yield or severance tax is collected when the timber is cut."

However, the laws in each state call for either special listing by the assessors or for special application by the owner. "The special effort and complicated procedure of the optional plan have apparently kept many owners from making application," according to the *Monthly Review*. No New England state has yet seen fit to make modified timber taxation universal or automatic," the article states.

A bill being considered by the New Hampshire legislature proposes a forest taxation reform that would give an incentive to standing-timber owners to abandon destructive cutting practices in favor of long-range management plans. It proposes that no annual property tax shall be assessed on any standing timber. The value of the land would be appraised and an annual tax assessed on it, but taxes would be collected on timber only when it is harvested.

Weyerhaeuser Plants Merge

Merger on July 1 of Willapa Harbor Lumber Mills and the White River Lumber Company with Weyerhaeuser Timber Company provided the leading story in the first issue of the Weyerhaeuser Magazine, a new company-wide publication of that organization.

Weyerhaeuser had been a controlling shareholder in the other two companies since their beginning, according to J. P. Weyerhaeuser, Jr., company president. He said, "The companies were merged to provide greater operating economies through the integration of forest management, research, logging, sawmill, and pulp operations."

Mud Mats Prove Economical

The use of wood or steel mats has been introduced as a new method for enabling logging trucks to traverse bottoms or other wet spots, and have been found less expensive than corduroy or plank roads.

Some operators have used steel mats of the type developed for the construction of military air strips. The mats are laid end to end in each wheel track.

A wood mud mat has been recommended by Howard H. Peck and Emmett A. Conway of the Ohio Division of Forestry. Three ten-foot boards from six to ten inches wide are slatted at right angles with boards six inches wide and two and one-half feet long, spaced four inches apart to allow the mat to become seated in the mud. Sound, low-grade, low-value, one-inch lumber is used.

Law Enforcement Emphasized

Commencing on July 1, the Georgia Bureau of Investigation is assisting the Forestry Commission in enforcing the state's forest fire laws.

In Georgia, a landowner can burn his own property if he wants to, but it is illegal for a fire to be allowed to damage timber properties of others.

"More fires were attributed to incendiarism than any other cause last year," said Guyton DeLoach, director of the Forestry Commission, adding, "We expect the increased law enforcement program to drastically reduce the number of unlawful fires in the future."

Operating Staff Reorganized

As a recently appointed vice president of the Simpson Logging Company, George L. Drake, chief forester and former Grisdale division manager, will assume new duties in charge of advisory functions and planning. He will remain at Shelton, Wash.

Concomitantly announced was the change in title to Shelton Working Circle Division of the three Woodfiber, Grisdale, and Shelton-McCleary Divisions. The Shelton working circle was established in 1946 under the Shelton Cooperative Sustained Yield Forestry Agreement.

New Model 5-A
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Newest, most compact model in the famous line of Pacific portable pumpers, proved in years of use by public and private forest fire protection agencies.
Power plus portability! The new light weight Model 5-A is easily transportable on foot, by truck or by air. Offered with choice of two pumps for volume up to 32 g. p. m. or for pressure up to 275 p. s. i.
WRITE FOR illustrated, Model 5-A specification sheet, or suggestions on applying portable pumpers to your fire problem.
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SEATTLE 1, WASHINGTON

Fire-Weather Data Broadcast

Short-wave radio broadcasts of fire-weather information were used to inform Washington loggers of hazards during the critical season.

Broadcasts were at 7:35 o'clock, both morning and evening, and were repeated ten minutes later over the state Division of Forestry network. W. D. Hagenstein, forest engineer for the West Coast Lumbermen's Association, stated that the total acreage burned in Washington by Juy 1 exceeded the acreage burned during the entire 1948 season.

Film Shows Fire Tool Use

"Only a Bunch of Tools," a 30-minute film recently released by the U.S.D.A. Motion Picture Film Service stresses the necessity for using the proper hand tools in fire control and the importance of cooperation in combatting forest fires.

The film is adapted for use in the 14 Northeastern states.

Smoke Swirls on Display

A new adaptation of an old principle has been used by the A. L. Lind Company, Minneapolis 10, Minn. to urge protection of forests from fire. The animated display is so constructed that the water in the stream appears to actually ripple over the rocks and the flames and smoke to ascend. The heat rising from a single light bulb causes a striped cylinder to revolve, and the shadows of irregular stripes on the translucent screen create the illusion of movement.

Banks, lumber yards, civic organizations, sport shops and others who are interested can obtain a display, which measures 16 by 19 inches, from state Keep Green committees or from state forestry commissions for $9.70 each. Appropriate state Keep Green Emblems are affixed.

Exhibit Has Live Animals

Housing native live animals and birds, a new trailer exhibit of the New York State Conservation Department is touring public campsites throughout the state to acquaint the public with the need for an adequate conservation program.

Initial showing of the mobile exhibit was at Saint Lawrence University in Canton, N. Y. on July 29 during a conference on conservation education held there.

Quinault Timber Fails to Sell

No bids were offered for 545,000,000 board feet of Quinault Indian Reservation timber which was up for sale at Hoquiam, Wash., on July 8.

Minimum bid value for the timber, over half of which was Western red cedar, was $4,626,650.

Timber Harvest Meets Standard

M. O. Stark, conservation forester with the International Paper Company, disclosed that of 107 private timber tracts observed during recent months in Mississippi, only 12 were cut below the minimum standards of the Southern Pulpwood Conservation Association. Those standards require that 6 seed trees or 150 saplings be left on each acre cut.

Ironsides Gets New Keel

Four Douglas-fir timbers, each 20 inches by 28 inches by 70 feet in length, are being used to replace the keel in the U.S.S. Constitution.

The timbers were logged near Dayton, Ore., cut to size at Westport, and shipped from Longview, Wash., to "Old Ironside's" moorage at the Charleston navy yard.

Forest Rehabilitation Begun

A ground-breaking ceremony on July 18 marked the effectuation of Oregon's 1949 Forest Rehabilitation Act, at Owl Camp near Forest Grove, Oregon.

Gov. Douglas McKay delivered the principal address at a brief program preceding a field trip conducted by N. S. Rogers, state forester. Paul M. Dunn was general chairman for the ceremony which marked the beginning of the rehabilitation program in the area of the Tillamook burn.

Fewer Free Trees Available

Only 3,000 instead of 5,000 pine seedlings will be given free to each applicant this planting season in

TREE CROPS— A BUSINESS

Our company, organized in 1947, administers the lands formerly owned and operated by the Red River Lumber Company of Westwood, California.

We are now engaged in taking inventory and in gathering other basic data. Our current objective is to determine whether it is economically feasible to manage our forest lands, and sell the products, without having any manufacturing plants.

SHASTA FORESTS CO.
REDDING, CALIFORNIA

South Carolina as a result of a recent legislative act.

E. B. Price, assistant state forester, says that if a landowner wants more than 3,000 trees the charge is $2.50 per thousand plus shipping charges of fifty cents per thousand trees.

Forestry Now an Actuality For Many Owners in South

"Forestry in the South is an actuality on much land and for many owners, and a rising tide of public interest and better performance is obvious on every hand." So states the 1947-1948 Biennial Report of the Southeastern Forest Experiment Station.

Large scale private acquisition resulted in the ownership of 4.6 million acres by pulp companies in the Southeast by the spring of 1948. Pulpwood production in Georgia, Virginia, Florida, South Carolina, and North Carolina (listed in descending order) was 6.3 million cords in 1948, the most ever, and 31 percent above 1947.

"Educational programs, often industry initiated and sponsored, were pushed vigorously," according to the Forest Service report.

Advice and assistance programs were greatly strengthened, and all these developments, states the report, indicate the widespread interest in forestry throughout the South and an encouraging appreciation on the part of landowners and industrialists of the possibilities of growing timber as a business enterprise.

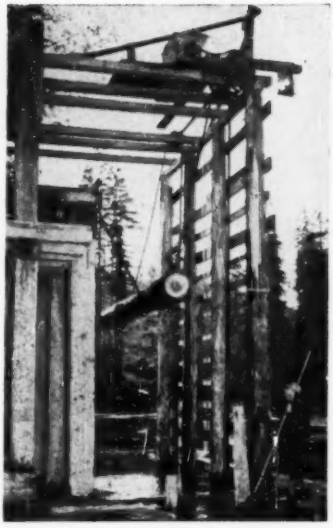
There is an increasing need for satisfactory knowledge of how to grow timber as a crop on private land for private profit, and the Southeastern Forest Experiment Station is attempting to attain that objective in its research program and through encouraging (1) more protection, (2) more planting, (3) less waste, and better forest practices.

Milling Costs Compared

"Lumber Values for East Texas Pine Logs" by G. R. Gregory and H. L. Person provides information concerning the effect of log diameter and quality on lumber grade yields, production costs, and net returns. Data are applicable to small or medium-sized mills cutting shortleaf and loblolly pine logs.

Among other facts revealed, the study showed that net sawing time per M varied from 23 minutes for 6-inch logs to 12-1/2 minutes for 18-inch logs.

Copies of the bulletin, Occasional Paper 113, are available from the Southern Forest Experiment Station, New Orleans, La.



Hoist Operates Electrically

K. B. McGuire & Sons, Ft. Bragg, Calif., in an electrically operated sawmill, use the illustrated method of hoisting redwood logs from the pond to the upper deck for milling.

A 60" Atkins pond saw is first used to buck long logs into desired lengths.

Electric power for operating the log hoist, pond saw, saw sharpener, overhead log turner, main waste conveyor, trimmer chain, two disappearing trimmer saws, and green chain is supplied by a Caterpiller D311 diesel electric set.

Wood Burning Methods Told

The sixth revision of "How to Burn Wood," an 18-page bulletin, has recently been published by the Northeastern Wood Utilization Council, P.O. Box 1577, New Haven 6, Conn. Price of the pamphlet is 25 cents.

Descriptions of improved wood heaters, a classification of wood fuel values, and ways of adapting furnaces to burn wood are included.

The use of wood for fuel in the form of sawdust, shavings, chipped wood, briquettes, and charcoal is also discussed.

"Down-draft" or distillation methods of burning are highly recommended.

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Information on preferred rates available to members of the Society of American Foresters for publication of professional cards in this department will be furnished on request.

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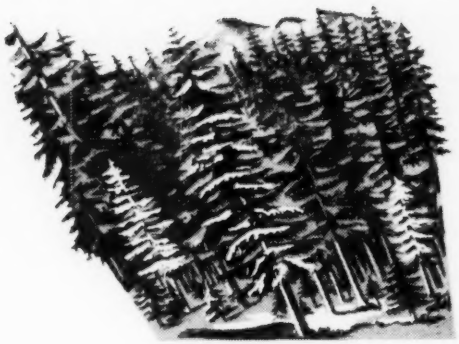
Upson Does Utilization Work At California Forest Station

Arthur T. Upson, since 1943 Director of the Tropical Region of the U. S. Forest Service and General Superintendent of the Insular Service Forests of Puerto Rico, has been assigned to do special forest utilization work at the California Forest Experiment Station at Berkeley. He is succeeded in the Puerto Rican post by Henry B. Bosworth, supervisor of the Texas National Forests.

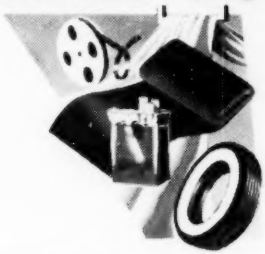
The California job will consist primarily of studying and stimulating plans and action for more complete and better utilization of wood material in the state. He has served 27 years with the U. S. Forest Service, one year with the War Production Board, and 11 years with the National Lumber Manufacturers Association.

Illinois is 11 Percent Wooded

Forest Survey Release No. 7, titled "Forest Resources of Illinois," states that the forest area of Illinois is four million acres, 11 percent of the total land area. Illinois' forests contain 10.3 billion board feet or an average of 2,625 board feet per acre.



WHAT IS PURIFIED WOOD CELLULOSE USED FOR?



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The tire manufacturers use purified wood cellulose in increasingly large quantities in the form of high-strength viscose rayon cords and fabrics that lengthen the lives of automobile and truck tires.

Cellophane is made from purified wood cellulose, and so is another widely used transparent packaging material—cellulose acetate sheet and film.

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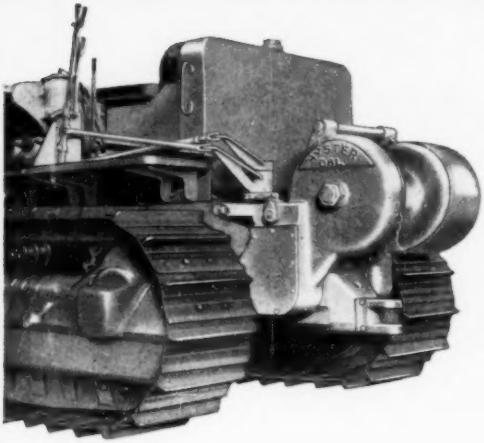

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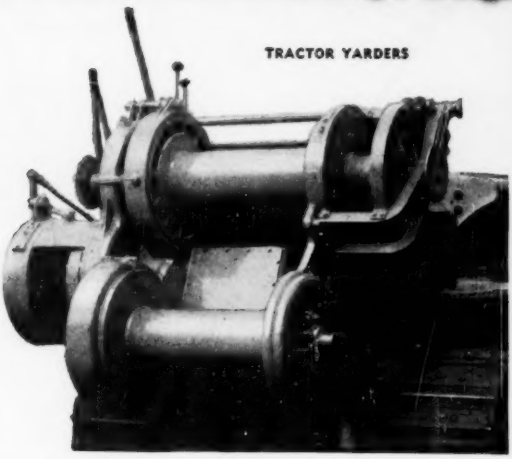

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